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NATURE MAGAZINE

eptember
1927

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Organized to Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

The American Nature Association seeks to find for Nature Study an essential place in every School and in every American Home. It is working for Forest and Wild Life Protection along sane, economic lines. It believes that clean, healthful Out-of-Door Recreation is the key to Good Citizenship

ONE OF OUR members calls our attention to an alleged photograph of a "fur-bearing fish" distributed widely by a national news photographic agency. Our member wisely comments that such stories should not be allowed to get in print. This is, of course, a hoax on the part of the individual who took the picture and is added to by the ridiculous story told in connection with it and also disseminated by the photographic agency. The yarn declared that the fish would break any ordinary hook and that the fisherman had to heat the hook and temper it by throwing it into the water. This same photograph was submitted to Nature Magazine and immediately returned with a letter calling attention to its absolute falsity and deploring the spreading of such tales.

* * * *

MEMBERSHIPS IN the American Nature Association were awarded in forest poster and essay contests held in Delta County, Colorado, under the supervision of the superintendent of schools of the County. Many groups are finding this an admirable and appropriate way of awarding prizes.

* * * *

REPORTS RECEIVED from the Association's expedition to the mountain goat country of the west indicate that some excellent material will be forthcoming. The Expedition is under the direction of Arthur Newton Pack, our President, and R. Bruce Horsfall, Art Director. It is completely equipped with cameras for still and motion picture work, and Mr. Horsfall has with him all necessary material for art work in the field.

* * * *

WHEN THE MEETING of the International Advertising Association was held recently in Denver, the Garden Club of that city took advantage of the opportunity to make a plea for the elimination of unsightly billboards. The Denver *Post* carried a box with a verse addressed "To Our Visitors," and which said:

"O, Advertisers, take your signs,
Take your billboards from our hills.
Let us see our stately mountains,
Let us keep their wondrous thrills.

Unlock for us our roadsides,
Give your billboards to the press.
We will read them there with pleasure,
No one person will buy less!"

* * * *

MAY WE AGAIN call attention to the Forestry Cartoon Contest being conducted by the American Tree Association. Full information can be obtained from the Association, 1214 Sixteenth Street, N. W., Washington, D. C.

* * * *

ALL UNSUCCESSFUL posters in both the professional and amateur classes in the American Nature Association's Outdoor Good Manners Cartoon Contest have been returned to the contestants. There were a few instances of no or inadequate addresses and these cartoons are being held in this office. More of the prize winning cartoons will be printed from time to time to carry the message of preservation of the beauties of the out-of-doors.

* * * *

JUDGING BY THE number of questions we receive, the Questions and Answers Department of Nature Magazine and the service rendered in this direction by the Association is one of the most valuable features we have. Only a small proportion of the queries are answered in the monthly column, and all are answered by mail as soon as possible. We should appreciate expressions of opinion from our members as to the value of this feature.

* * * *

BY THE TIME that this issue of Nature Magazine is in the hands of the members the new building of the Association will be ready for occupancy. Members are invited to visit the office when in Washington.

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"Hike-along"

Tramping and Trailing with the Girl Scouts is of particular interest to everyone who hikes or camps as it gives excellent ideas on out-of-doors housekeeping including kinds of fires for different sorts of cooking, suggested menus with the amounts of food needed for varying numbers of people: how to choose a camp site with the reference to drainage, water supply, means of sanitation: how to prepare and carry a pack as well as the limit to be carried on short or long hikes. A hike is more interesting if it is well planned and this book gives a number of programs which include suggestions for observation and conservation of Nature's beauties, laying and following trails, map-reading, exploring, use of the compass and songs to sing along the way. This may be obtained from Girl Scouts, Inc., 670 Lexington Ave., New York City for thirty-five cents.

On South America

One of the most fascinating things about South America is its wild mammal and bird life and this phase of the natural wealth of the country is given considerable prominence in a new volume that the World Book Company, Yonkers-on-the-Hudson, has added to its geography series. This book is entitled *From Panama to Cape Horn* and is written by Ethel Imogene Salisbury. The volume is designed as a text for intermediate grades, is well illustrated and simply and entertainingly written. It is specially adapted to school use with the inclusion of questions on text that has gone before. It is listed at $1.40.

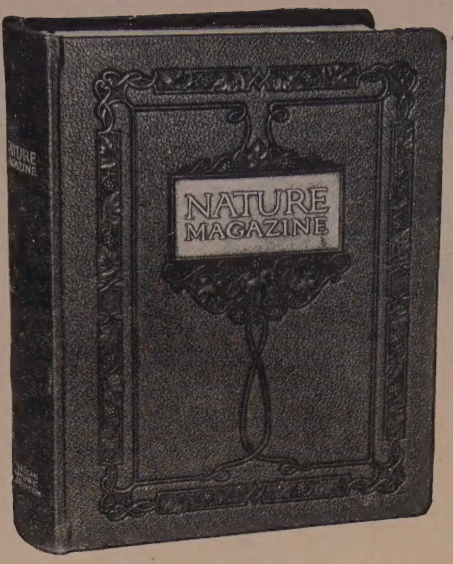
About the Dachshund

We do not know of any other book devoted to the Dachshund and printed in English other than a little brochure that has ... published by the Judy Publishing ...

6(388)

Back to the Farm

Anyone who was reared on a farm, however much the city has changed them, must experience now and then an urge to return, and Robert Sparks Walker is one of these. In a new book of poems brought out under the title *My Father's Farm*, Mr. Walker assembles an entertaining group of Nature and outdoor verses. His poetry is simple and straightforward, descriptive and refreshing. The book is published by The Four Seas Company of Boston and sells for two dollars.



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Every number of NATURE MAGAZINE is worth reading again and again. For your convenience and pleasure, we have secured an entirely new binder for copies.

Grasp this opportunity for greater enjoyment from your magazines—bind them in our special two-tone, hand colored cover, embossed in gold and they will be preserved to give you a lifetime of enjoyment.

Many requests make it possible for us to offer you these artistic, leather-like covers pictured above, especially created for members, in which you can insert each issue as you receive it, in a half minute, without any punching or other annoyance to your patience.

EACH BINDER WILL HOLD TWELVE ISSUES AND IS GUARANTEED. YOUR MONEY REFUNDED IF YOU ARE NOT MORE THAN PLEASED.

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THE AMERICAN NATURE ASSOCIATION
Washington, D. C. Date.....

Send me..... Distinctive covers for NATURE MAGAZINE, for which I enclose $..... If I am not unusually pleased I will return them to you within 5 days, and my money will be refunded to me.

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Street .....

City and State .....

BOOK UNTIL FIRST ISSUE AFTER
Dec 1927

Van Bourgondien

DAFFODILS - *The Finest Bulbs We Have Ever Harvested*

AS a matter of fact we can say that the Daffodil bulbs we have grown this year in our Babylon Nurseries are the finest we have ever seen either in Holland or in America. Large, healthy, well-ripened bulbs to bring brightness of color —sunshine and joy to your Spring garden.

Our catalog describes ample and choice varieties with a special collection for those who want Daffodil Novelties. For eight years we have been growing Daffodils on Long Island successfully.

Our Special Suburban Daffodil Collection

	Doz.	100
Campernelli Odorus Rugulosus (Jonquils) Small cluster golden yellow flowers.	$1.35	$10.00
Conspicuus (Barrii) Golden yellow perianth, red edge on cup.	1.75	12.00
Emperor (Yellow Trumpet) Sturdy all yellow flower.	1.50	11.00
Evangeline (Leedsii) All white flower.	1.75	12.00
Glory of Sassenheim (Bicolor) Perianth white, trumpet golden yellow.	2.00	15.00
Golden Spur (Yellow Trumpet) Medium size. All yellow. Early.	1.50	11.00
Laurens Koster (Poetaz) White perianth, delicate orange cup.	$1.50	$11.00
Ornatus (Poeticus) Snow white perianth, red eye. Early.	1.35	10.00
Pheasant Eye (Poeticus) Snow white perianth, red eye. Fragrant. Late.	1.35	10.00
Queen of the North (Leedsii) All white. Very fine and free.	1.75	12.00
Sir Watkin (Incomp.) Yellow perianth, deep cup. Free flowering.	1.50	11.00
Victoria (Bicolor) Pure white perianth, golden trumpet.	1.50	11.00

5 Bulbs each of the above 12 varieties	(60 bulbs)	$ 7.50
10 Bulbs each of the above 12 varieties	(120 bulbs)	14.00
25 Bulbs each of the above 12 varieties	(300 bulbs)	32.50
100 Bulbs each of the above 12 varieties	(1200 bulbs)	125.00

We guarantee all our bulbs whether grown in Holland or America.

Catalogue with Beautiful

Mention NATURE MAGAZINE. *It will facilitate service.*

Brothers' Bulbs

TULIPS - *Darwin, Cottage, Breeder, Lily-flowered and Novelty Types*

OUR 1927 catalog which may be had upon request, contains, we believe, the most life-like color illustrations of Tulips shown to date in any catalog in America. This year's crop of Tulip bulbs is the best for several years in quality of bulb and extent of variety. There is nothing to take the place of the Tulip in the May garden.

Here are two collections designed to give you a garden of wonderful Tulips. Rich royal colors in the handsome Darwins, charm, beauty and distinction in the softer colored Cottage varieties.

Our Special Collection 12 Darwin Favorites

	Doz.	100
Baronne de la Tonnaye. Clear carmine rose running to soft pink.	$.60	$4.00
Bartigon. Fiery crimson, white base.	.65	4.50
Clara Butt. Clear salmon pink, finest pink.	.60	4.00
Dream. Beautiful shade of lilac. Gigantic size.	.65	4.50
Farncombe Sanders. Exquisite brilliant scarlet. Strong grower.	.65	4.50
Inglescombe Yellow. Clear golden yellow. In reality a Cottage.	.55	3.50
Loveliness. Satiny rose. Very dainty.	.60	4.00
Massachusetts. Very fine pink white edge, white base.	.60	4.00
Pride of Haarlem. Brilliant rose carmine.	.60	4.00
Psyche. Old rose with slightly lighter edge. Blue base.	.60	4.00
Remembrance. Lilic, shaded mauve.	.60	4.00

5 Bulbs each of these 12 varieties	(60 bulbs)	$3.00
10 Bulbs each of these 12 varieties	(120 bulbs)	6.00
25 Bulbs each of these 12 varieties	(300 bulbs)	12.00
100 Bulbs each of these 12 varieties	(1200 bulbs)	45.00

Our Special Collection 12 Cottage Favorites

	Doz.	100
Fairy Queen. Rosy heliotrope, broad amber yellow margin.	$.60	$4.00
Gesneriana Lutea. Pale yellow of enormous size.	.60	4.00
Gesneriana Spathulata. Brilliant scarlet, blue center.	.55	3.50
Inglescombe Pink. Soft rose with salmon flush.	.60	4.00
Inglescombe Yellow. Like a golden yellow Darwin.	.55	3.50
Isabella. Carmine rose shaded creamy white.	.55	3.50
La Merveille. Orange cherry, flushed rose.	.60	4.00
Moonlight. Pale yellow, extraordinarily beautiful.	.70	5.00
Orange King. Bright deep orange.	.60	4.00
Picotee (Maiden's Blush) White heavily margined rose	.60	4.00
Sir Harry. Large lavender pink, fine shape.	.75	5.50
The Fawn. Pale rosy fawn changing to blush rose.	.65	4.50
Zulu. Blue black, very distinguished.	.60	4.00

5 Bulbs each of these 12 varieties	(60 bulbs)	$2.75
10 Bulbs each of these 12 varieties	(120 bulbs)	5.50
25 Bulbs each of these 12 varieties	(300 bulbs)	12.00
100 Bulbs each of these 12 varieties	(1200 bulbs)	45.00

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Box A — Babylon, Long Island, N. Y.

Color Illustrations — "FREE"

Audubon Bird Charts

Twenty-six Common Birds
(In Color)

Drawn by EDWARD KNOBEL
under the direction of RALPH HOFFMANN

The Birds pictured are as follows:

Red-winged Blackbird	Golden-crowned Kinglet
Bluebird	Robin
Bobolink	Chipping Sparrow
Catbird	Song Sparrow
Cedar Bird	Barn Swallow
Chickadee	Chimney Swift
Purple Finch	Scarlet Tanager
Flicker	Wood Thrush
Goldfinch	Red-eyed Vireo
Ruby-throated Humming-Bird	Black and White Warbler
Blue Jay	Yellow Warbler
Kingbird	Downy Woodpecker
Baltimore Oriole	House Wren

Interesting-Instructive

Awaken the interest of children in our common birds with these charts depicting the natural colored, life-sized birds in their characteristic attitudes. They are practical and helpful in all nature study and drawing.

Lithographed and mounted on cloth. Size 27 x 42 inches

For
Home Schoolroom Library

Four Beautiful Charts

Price $2.50 Each

AUDUBON BIRD CHARTS
1214 Sixteenth Street
Washington, D. C.

Vitamines for Fido

The much-advertised vitamine does not end with the superior *homo sapiens*. That is one of many things that Josephine Z. Rine brings out in her new book, *Feeding Your Dog*, published by G. Howard Watt, 1819 Broadway, New York. This helpful volume for the dog owner discusses the diet of the dog at all ages and under varying conditions of health. It is a practical book with common sense advice based upon experience in the breeding and raising of dogs. It even has nutrition charts as well as photographic illustration. It sells for two dollars and is worth it.

Our Contemporaries

We should have mentioned before under this caption the March-April issue of *Natural History*, bi-monthly of the American Museum of Natural History. This issue is dedicated to Carl Akeley, naturalist, conservationist, sculptor, inventor and explorer. It is a glorious tribute, worthily done to one worthy of it. It is illustrated with pictures of Mr. Akeley's habitat groups, sculptures and results of his field work. It is an historic issue because Mr. Akeley left great and significant contributions to posterity.

Particularly interesting in the July-August issue of *The Condor*, bi-monthly of the Cooper Ornithological Club, is Arthur H. E. Mattingly's article on the relation of cormorants to fisheries. There are, of course, several other articles and the usual interesting notes on subjects relating to western bird life.

The summer issue of *Amateur Aquarist and Reptilian Review* quarterly of the British Aquarists' Association, contains the usual brief but helpful articles for those interested in aquaria. Dr. H. B. Jones discusses an interesting fancy goldfish, the lionhead. It is an instructive little publication, in no small measure applicable to American needs.

A story of the mental processes of a robin mother by Laton A. Huffman is the feature of the June issue of *The Guide to Nature*, published by Edward F. Bigelow. With the sky article and book reviews, it about monopolizes the issue.

W. M. Buswell writes of the interesting cannon-ball tree in the July issue of *The American Botanist*. This is also a particularly rich issue in a variety of directions.

For Fishermen

What do you know, Mr. Fisherman, about the pike or the pickerel you have succeeded in luring to your hook? If you have any doubts about what you know, or want to know more, you will find the latest leaflet of the Field Museum of Natural History in Chicago of valuable assistance. It is entitled *Pike, Pickerel and Muskalonge* and is written by Alfred C. Weed, assistant Curator of Fishes. It is a fine discussion of these fishes and is illustrated in color, a very valuable detail. The leaflet is 52 pages exclusive of the colored plates and is Number Nine in the Zoology series. It can be obtained from the Museum for 75 cents.

GROUND SQUIRREL AT NATURE'S DINING TABLE

The American Nature Association *Presents*

GUY C. CALDWELL

In Nature Programs De Luxe

Illustrated by motion pictures, hand-painted slides and autochrome plates (Mr. Caldwell has the largest and finest collection of western wild flowers in autochrome extant)

200 BIRD SONGS and CALLS by natural whistling. Unusual movies of water ouzel and other western birds secured this summer

During the past season Mr. Caldwell presented some 125 programs and the comment invariably was "The most beautiful program we have ever had." He has 30 return engagements this season

For lecture engagements address

Extension Department
American Nature Association
15 Boudinot St., Princeton, N. J.

Wild Life Adventures
by Howard H. Cleaves

Mr. Cleaves is now on the coast of the Canadian Labrador. He will remain in the field more than three months taking photographs and motion pictures of the birds and other life of that region. This is the country visited by John James Audubon nearly one hundred years ago.

Articles for Nature Magazine telling of his Labrador experiences will be prepared by Mr. Cleaves and his new lecture *Cruising the Canadian Labrador* will be ready Nov. 1st. Mr. Cleaves offers also *Outdoors in the West*, *Birds of the Atlantic Coast* and other illustrated lectures on wild life adventure and travel. For terms and information address: *Extension Department*,

AMERICAN NATURE ASSOCIATION
15 Boudinot Street Princeton, N. J.

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LECTURES

on

Nature Subjects

and the

Great Out-of-Doors

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AMERICAN NATURE ASSOCIATION

15 Boudinot Street, Princeton, New Jersey

Spectacular Motion Pictures of Wild Life

William L. Finley

who is generally acknowledged to be the most successful photographer of American wild animals and birds will lecture during the season of January 1 - May 1, 1928.

Wherever Mr. Finley has lectured in the past his moving pictures have been acclaimed as the most remarkable ever seen.

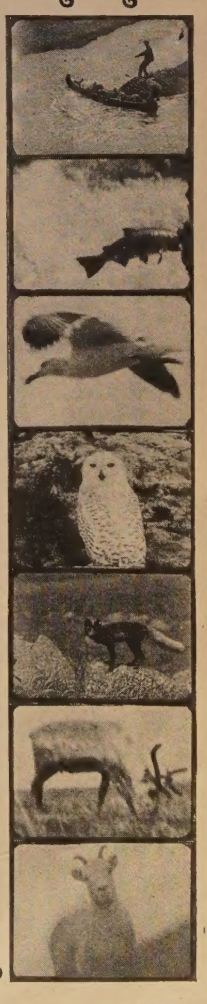
Wild Animal Outposts—a motion picture story and lecture on Alaska and the Bering Sea—sea birds, foxes, bears, and all the magic of the great northland, also

Travels in the Land of Fear—the kind of wild animal picture you will never forget—the kind which only Mr. Finley can produce.

Every Club or School Lecture Program Should Include These

Dates for the coming season may still be arranged by addressing

Extension Department, American Nature Association, 15 Boudinot Street, Princeton, New Jersey



INTERNATIONAL

SACRED BABOONS IN SOLEMN CONCLAVE ASSEMBLED

NATURE MAGAZINE

PUBLISHED BY

THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

PERCIVAL S. RIDSDALE, *Managing Editor*
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NATURE CALENDAR

SEPTEMBER

by E. Laurence Palmer

FOUR HUNDRED and five years ago this September man circumnavigated the globe for the first time. This last summer men flew from California to Hawaii, New York to Paris and New York to Germany for the first time. Possibly by the time this gets into print they will have added many other interesting feats of travel but even then they may not equal a few of the travel records made each year by hundreds of forms of wild life, though the speed of an airplane probably exceeds that of living animals. I know of no record of airplanes flying from the Arctic Circle to the Antarctic Circle and yet each year the Arctic terns make the complete round trip and apparently think nothing of it.

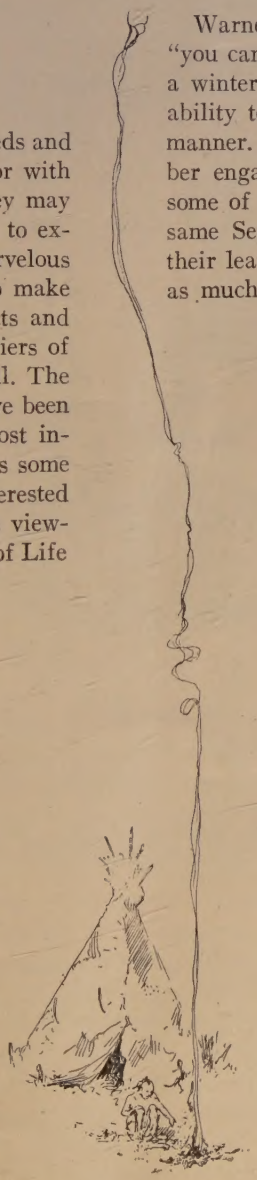
Every Fall the air is full of millions of seeds and fruits supplied with wings like airplanes or with parachutes and no one knows how far they may travel with the winds. It seems reasonable to expect that they may establish some really marvelous records. September is a splendid month to make a study of the way birds, mammals, insects and plants navigate not only the air like the fliers of this last summer but the waterways as well. The story of how plants and animal species have been distributed over the earth is one of the most interesting in the field of Nature and involves some of the most serious of study. If seriously interested in this subject you might enjoy getting one viewpoint by reading, "Distribution and Origin of Life in America" by Robert Francis Scharff.

If not seriously-minded along Nature lines one may be interested to know that Charles Dudley Warner was born in September and later wrote, among other things, "Backlog Studies" and "My Summer in a Garden". Thoreau told us about eating purslane as a salad but lacked in the telling the delightful humor that attaches to the habits of "pusley" as repeatedly recorded by Warner in "My Summer in a Garden".

If you are among the few who have persisted in caring for your garden through the summer with the diligence shown in the spring and have not read Warner on the subject you will find in him something that will permit a smile on your face to offset the "crick" in your back. If you have never examined closely the rather unique flowers of purslane and the peculiar method by which the fruit opens to free the seeds you may be interested in that though you may not like the weed. See for example if you can find a single other garden weed that splits its fruit in a similar manner.

Warner speaks of the September sun saying that "you can stand a good deal of it, and apparently soak a winter supply into the system." He deplores our inability to soak in our winter fuel supply in a similar manner. There are plenty of creatures that spend September engaged in laying aside their winter fuel supply some of them getting a great deal of it from that selfsame September sun. Watch how many plants adjust their leaves during the day so that they may "soak in" as much of the sun's rays as possible. There may of course be too much of a good thing and it is not surprising to find some plants like the cat-tails that apparently adjust their leaves so that they get a maximum of light in evening and morning but expose a reduced surface to the intense mid-day sun by standing erect.

"Hawk-eye," Cooper relates, could go through the woods and leave no trail. Many who now go over the same trail would leave no woods if it were not for the educational campaigns which have done so much to show at least a few people how to respect the rights of those that follow them. Some time when you are following someone through a leaf-strewn woods in September see if you can't detect the way a heel packs leaves together so that they do not pull apart easily or so that they retain moisture that quickly evaporates from loose leaves. Read the "Last of the Mohicans" and see how many of the Nature experiences there pictured can be experienced by you in your own wood-lot today. Can you follow a trail through grass? Can you leave your camp as well as when you selected it?



IN THE WILD JUNGLES OF CEYLON, OF WHOSE FREEDOM BOLIVAR DREAMED

From an original etching done specially for Nature Magazine by Benson B. Moore

NATURE MAGAZINE

Volume Ten
No. Three

September
1927

BOLIVAR CAME TO THE PHILADELPHIA ZOO
AS A CHRISTMAS PRESENT

The TAMING of BOLIVAR

by Dallas Lore Sharp

Illustrated by R. Bruce Horsfall

THERE is bound to be conjecture enough and to spare in this story, do all I can to stick to actual facts and happenings, for it is chiefly concerned with what went on inside of an elephant's head, and an elephant's head is a particularly thick one to see the inside of. So, in order to check up on the notes in the diary of my friend, Mr. Alexander Pope, the animal painter, who was an eye witness of the principal event of the story, I wrote to Mr. C. Emerson Brown, the present director of the Philadelphia Zoological Garden.

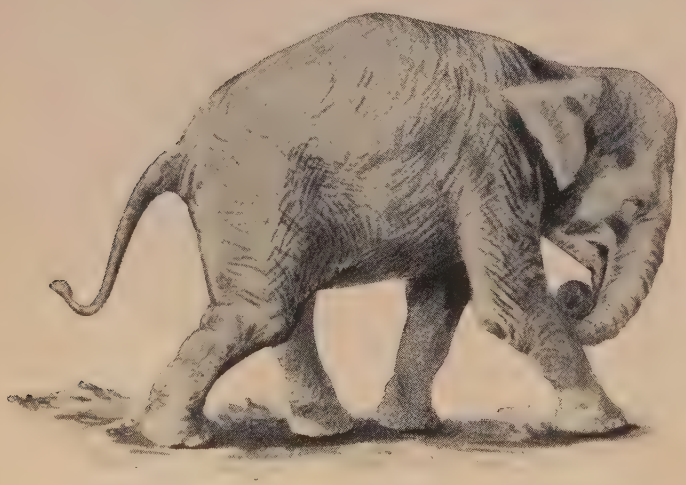
"Replying to your letter regarding the elephant Bolivar," Mr. Brown writes, "I would say that this elephant was presented to the Zoological Society by Adam Forepaugh on Christmas Day 1888. He was the largest elephant in captivity at that time. As a native of Ceylon, he was credited with the intelligence and docility of a Ceylon Elephant, but he really had small sense, and the ugly disposition of the African Elephant. He was extremely intractable and would not be taught to perform any sort of tricks or labor. At the time he was brought to the Zoological Garden he had already killed two men. Here he was placed in a cage of sufficient strength to hold him, and a chain extending from his ankle to a heavy beam held him secure.

"He was an immense animal when he came to the Zoo. In 1882 he was weighed on a railroad scale at Jackson, Michigan, and found to weigh 9600 pounds, and at this time he was about twenty-five years old. Bolivar was undoubtedly the largest elephant ever seen outside of India and Siam. Jumbo exceeded him only in height from shoulders to head; Bolivar was higher across the rear part than Jumbo and his body was at least a foot wider and longer than Jumbo's. His head was very large and square with small, shapely ears, probably only one-third as large as Jumbo's, for the African elephant has enormous ears." Thus wrote Director Brown.

Such was Mr. Adam Forepaugh's Christmas present to the Philadelphia Zoo. One mustn't look a gift horse in the mouth. But a Christmas gift horse—one should be able to look a Christmas gift horse in the mouth without either being bitten or finding that the nag couldn't bite. Mr. Adam Forepaugh did not send Bolivar done up in tissue paper and red ribbon, with a T.B. stamp on his back and a bit of holly on his tail. The Philadelphia Zoo knew what it was getting, and wanted it, though no merry wishes came with it, and no hopes for a happy New Year.

Trouble came with it instead. Bolivar didn't do anything bad. He didn't need to. Just being Bolivar sufficed, and just being in the Zoo. Everything began to go bad at once, and everybody, even the two very proper elephant spinsters of the house. How did they get hold of Bolivar's previous record? They may have overheard Harrison, their keeper, saying to Mr. Brown how kind it was of Mr. Forepaugh to send Bolivar to them after he had killed only two keepers. One thing is certain: these two decent-minded female elephants gave the biggest male elephant in the whole Show World an immediate sizing and found him small, and something worse.

So trouble began in the Elephant House, not rowdy, furniture-breaking college-boy trouble. An elephant is not a shallow beast. The temper of the jungle is not noisy; nor is the temper of a prison when a wholesale delivery is hatching. Harrison began to have "nerves". The



"SHE LOWERED HER HEAD TO GIVE BOLIVAR ANOTHER BROADSIDE"

atmosphere of the Elephant House had changed. Bolivar did nothing. His thick, wrinkled, neutral hide revealed nothing. But his little pig eyes showed a sinister soul.

The two females despised Bolivar. Empress, the older and larger of the two, began at once slyly to steal his ration of hay. Of course this didn't tend to improve the spirit of the Elephant House. At this particular time Bolivar was not chained to a beam, but was more closely shackled by four chains, one from each mighty foot, to four heavy ringbolts in the floor. He had very little freedom; whereas the Empress, fastened by only one foot, with plenty of chain, could swing over when the keeper wasn't looking, and hen-peck King Bolivar as only an Empress can.

Bolivar hated all mankind, and all elephant kind, and the Empress most cordially. The Empress, on the other hand, was fond of herself, and especially fond of her keeper, Harrison, and of her reigning place in the Zoo, or had been, rather, up to the time of the coming of Bolivar. Perhaps after all, she had a ticklish, sensitive disposition and was jealous of the way people stared at Bolivar and threw him peanuts, the very people who used to stare at her and throw her peanuts. Perhaps she was jealous of her keeper's divided attentions now, for Harrison was doing his best to get into the good graces of the bitter old bull.

Harrison wondered as to this, for the change which had come over the Empress worried him. Was it nothing but jealousy, or had the evil spirit of Bolivar entered into the Empress and her young companion, and must he be on his guard against his whole house? He knew he took his life in his hand every time he approached Bolivar, but the Empress—he would have trusted the Empress not to tread on a creeping baby in her stall!

The keeper talked the situation over with the Director, who was then Mr. Arthur Brown, a man wise in the handling of wild animals. No keeper can allow himself to become so accustomed to his job that he goes mechanically from pen to pen, or moves carelessly among so wise and kindly a people as tame elephants. If he does so he is opening the door of opportunity to some new animal keeper.

By the same token a nervous, timid keeper is worse than one already eaten alive. If Bolivar "was on Harrison's nerves" Harrison wanted to know it. Perhaps this ominous, foreboding, deadly spirit of the Elephant House was all in his imagination. Had Bolivar's reputation as a man killer got the keeper to seeing things, or were all three elephants plotting against him? He knew that nothing is more quickly detected by wild animals than fear. The taint of it carries farther in a Zoo than the taint of "high" meat carries on the air of the jungle.

But it was evident to everybody that there was a settled, soured temper in the Elephant House, a plot of some sort, and that the Empress was in it no less than Bolivar. That Bolivar brought it with him was certain. But just how the Empress was mixed up with it was not so certain, nor just who else, nor just how it was going to be carried through. One thing keeper Harrison was sure of, however, and that was, between him and the pitchfork, in marking him for his third victim Bolivar had marked the wrong man. What worried him more was the sulking of his pet the Empress.

Not that she or her younger companion openly disobeyed. They went through the motions of every order, but they did everything grouchily, moodily, with an eye that followed the iron or the hay fork in the keeper's hand. This was contrary to steadfast elephant nature, as unnatural as it would be for a faithful dog to turn against his master.

With Bolivar the keeper had a plain talk at once. He told him that he knew his story, that he was a man-killer, that once an elephant had committed murder he brooded on it, and could think on nothing else. However, he said, if Bolivar would accept his new situation and make the best of it, then everything that any keeper could do to make an elephant feel at home and comfortable should be done for him. What franker understanding could there be?

So matters stood, and Bolivar tried to hold himself together, and did hold himself together to the extent of adding a neat little thousand pounds and more to his weight. But an evil heart is something that cannot be easily larded. Bolivar hated the divine image of man and was intent on destroying it, especially the image of Elephant Keepers.

That he had some cause for hating men, liberty-loving man will admit. Here in the steam heated, narrow, brick prison, clanking chains about all four of his galled and aching feet, the daily object of noisome, gaping crowds, he dreamed of the freedom of his own wild jungles of Ceylon,—when he wasn't seeing through his little pig eyes the night-mare of his real existence. That he had killed only two of his keepers instead of trampling down the whole human race of wild animal hunters, trappers, and circus exhibitors, might, if looked at from an elephant's point of view, be counted in Bolivar's favor, something to his everlasting credit.

But this is not the place to inquire into the inalienable rights of elephants. If wrong had been done Bolivar, Harrison couldn't help it. He couldn't ship him back to Ceylon and free him in his native jungle. And if he could, he wouldn't dare to, for the first use Bolivar would make of his freedom would be to raid the nearest human village and kill every man, woman, and child in it. The harm had been done and Harrison's duty, as he saw it, was to look after his own bones and then after Bolivar's, to make the great captive's life as interesting and comfortable as possible.

An elephant can hide his intentions, but he cannot hide his fears. A mouse in Bolivar's straw would cause him to shiver like a cold puppy. One day a fighting pair of English sparrows fluttered down from the rafters upon Bolivar's back and nearly threw him into a mortal panic. But toward Harrison he showed neither hate nor fear, only watchfulness. He never slumbered, and his eye never left Harrison as the keeper moved about with hay, or did the humble chores necessary to his charge's health and comfort.

Bolivar knew right well the bite of the pitchfork. He had been punished for his crimes. They might punish him again. He was not afraid of any new thing they could do to him. The prospect of death, perhaps, he could nowhere place in the long purview of chains and iron hooks and sharp-tined forks and Christian crowds —crowds his heathen soul longed to charge and trample into dust. Favors appealed to him no more than threats. The fear of the Lord had passed out of Bolivar, and one consuming desire had entered into and possessed him.

Was it right to the public, to say nothing of the keeper, to risk so much for the sake of even the greatest show animal on earth? Suppose some day the ugly brute should break loose when the house were full of children? But give me time was Harrison's answer, there must be some way of taming Bolivar. So they replaced the chains with heavier ones, and kept close watch over the big ringbolts.

One morning, the Empress having been loosed and told to go out for a tubbing, Harrison started down toward the distant end of the house, when he happened to turn in time to catch his pet sidling up toward Bolivar who was humped in rage, ready to smear her carcass against the wall could he only get loose. Harrison gave the wily Empress a mighty whack with his broom and sent her shuffling out to her bath. Again one day he caught her grabbing Bolivar's straw. This time she came in for something more than the broadside of a broom.

Harrison brought Bolivar fresh straw, with an extra forkful of hay, and while the Empress looked on, handed him a big red apple. The Empress danced with jealousy, and Harrison let her dance, hoping it might be balm to Bolivar.

"SNORTING AND SQUEALING MALEDICTIONS"

But there was no balm in circus tents or wild animal zoos for Bolivar. Mankind had overdrawn its account in his Trust Company. Harrison soon knew that if Bolivar had not attempted to kill him it was simply for lack of chance. Once he had reached that conclusion he tried to win back the affections of the Empress, but in this he apparently failed. She openly disapproved of him. She hated him for having anything to do with Bolivar, swinging around, throwing forward her small ears, and staring at him whenever he approached the big bull, as more than once to make him wonder if her look were really of wrath or fear.

One morning it was necessary to remove the iron cuff from Bolivar's left front ankle. Accompanied by the veterinary Harrison entered the pen and told Bolivar to pick up his sore foot. Instantly the Empress wheeled, raised her trunk, and watched with intense interest. Or was it concern? No, she was just a female and jealous.

The coming of the doctor with his smells and authorities was an event in the Elephant House. Even Bolivar was interested in doctors, and picked up his big foot.

But he was also interested in the Empress, who kept clanking her chain, raising her trunk and grunting. Bolivar lent her a careful ear.

The big elephant now stood with his chafed foot free. He had a habit of resting himself by slowly rocking back and forth, like an anchored ship upon the heaving sea. So he would shift his mountainous weight from two legs at a time, his more than five tons of heft as in a cradle giving the muscles sleep. And, as the cradle rocked, two leg chains would rise with a clank, the opposite two falling with a muffled roll of separate links dropping.

When the keeper made his last round of inspection through the Elephant House that night Bolivar's dim hulk was rocking in the gloom on as quiet a current of being as ever carried a captive elephant. But the keeper might have heard a more than usual snap to the chain in the forward right ringbolt. And he might have heard in the night a new sound in the Elephant House: the *click-clack, click-clack* of the forward right ringbolt as it worked looser and looser in its socket in the floor.

All of this was lost on the ears of the keeper; but there were other ears in the Elephant House which heard *click-clack, click-clack* of the forward right ringbolt at night. And if ever an Elephant House showed that it had passed a sleepless night it was this one in the Philadelphia Zoo. Keeper Harrison knew something was the matter the instant he entered the House, though everything appeared as usual.

With every sense alert he freed the two female elephants as usual for their exercise in the yard. Hardly had the chain dropped from the leg of the Empress, however, when with a shrill squeal of fury the big brute gathered herself into a hump, head down, hips up, and lunged for Bolivar, striking him in the ribs with a grunt like thunder, sending him to the floor in his chains.

He went down with a roar, the right forward ringbolt flying from its socket in the fall. Up he got to his knees, trumpeting death to men and elephants. But the chains about his hind feet held him fast.

Pandemonium was loose. Expecting to be trampled by the stark mad Empress the keeper leaped between her and the prostrate Bolivar and drove her back to her stall. She went, swinging her trunk aloft, snorting and squealing maledictions. Snapping on her chain Harrison came back to Bolivar and got him to his feet, a much shaken elephant.

Then suddenly a question in the keeper's mind, never more than a hazy, half question, received a startling, clear-cut answer. The Empress was faithful to him. Not jealous, but alarmed for his safety since the coming of Bolivar. The revelation staggered him, and in a flash he had the key to order and safety in the Elephant House.

"What is the key?" asker the painter, Mr. Pope, who happened in just after this event. Harrison sent for Director Brown. The three men entered the pen, and Harrison unchained the Empress. She wandered quietly over to Bolivar, and began slowly to rasp her trunk over his back and sides with a scraping sound as of a dory being dragged over a sandy beach.

She was all gentleness. But she kept a wicked little eye hard on her keeper. Bolivar was standing braced as if expecting to be rammed. The men stepped back out of sight. Instantly the friendly manner of the Empress changed. Backing with incredible speed, she lowered her head to give Bolivar another broadside when the keeper fairly caught her in the plunge and turned her, but not before the glancing butt in Bolivar's short ribs had brought him nearly to his knees.

The Empress swung back to her stall like a lamb. And she left Bolivar in his stall much like a lamb. He knew now what was expected of him, and who expected it. If not gentled he was tamed, and the Empress had no more anxiety on account of him. He even died a natural death in the Zoo, after a sojourn there of about twenty years. And so calm was his spirit that, when at last his end came at the ripe old age of fifty-seven or fifty-eight years, he weighed 12,000 pounds, a gain for exhibition purposes, since the Christmas of his arrival, of a little more than a long ton. And what greater measure of virtue than the long ton could there be for Bolivar or any other exhibition elephant?

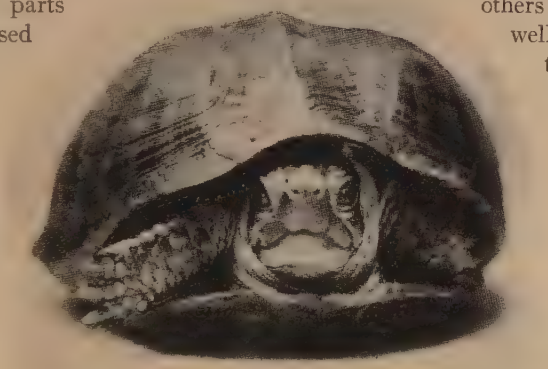
"SHE WAS ALL GENTLENESS"

The BOX TURTLE

MY, THE TRAFFIC IS HEAVY
This eastern turtle was rescued by a friendly autoist on a Maryland highway

by
Doris M. Cochran
of the
U. S. National Museum

PROBABLY the most interesting fact about a box turtle is that you can always recognize one when you see it. All turtles are covered with a sort of armor which is formed of the backbone and the much broadened ribs which are solidly fused together and covered with large scales. The head, legs and tail protrude from beneath the edge of this shield-like cover when the creature is living under normal conditions. But the box turtle, when annoyed or frightened for any reason whatsoever, can withdraw his head, legs and tail entirely within his shell, the lower part of which is hinged and movable, and closes up so that the soft fleshy parts of the body are completely encased in a solid covering of bone. Indeed, so tightly has the turtle shut himself into his armor that often there is no place where so much as a piece of paper could be pushed between the edges of the upper and lower shell, nor could any prowling four-footed enemy make an opening. But the turtle does not remain "boxed up" indefinitely. If you watch him quietly for a few minutes, the powerful muscles which effect the closure of the "lid" will begin to tire, and soon the animal will slowly thrust forth his head to find out if the coast is once more clear, and eventually will waddle off as if nothing had happened.



YOUNG ORNATE BOX TURTLE
A young fellow, who is known as Terrapene ornata and hails from New Mexico

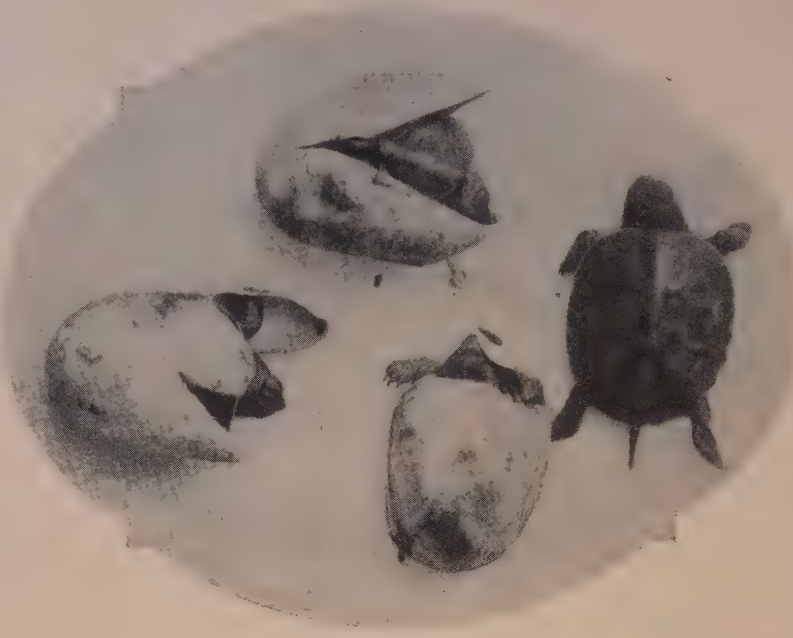
Sometimes in fields where a plentiful supply of wild strawberries or other succulent fruits may be found, the box turtles of that region become so fat that they cannot completely close both parts of the shell, and if you happen to pick up one in this condition, it is amusing to watch him vainly trying to close the front entrance of his shell, while the back entrance is forced slightly open by his own too fat little legs. The musk turtle and the "semi-box turtle," *Emys blandingii,* are able to move the lower shell also; but in no case is the closing as complete and effective as it is in the true box turtles. In Africa, there is a kind of turtle, much larger than our box turtle but probably similar to it in its habits, which has a partial hinge on the back portion of the upper shell, so that this upper part may be closed down to meet the lower part of the shell,—just the opposite of what happens in the closing of the box turtle's shell.

The common box turtle, *Terrapene carolina,* is frequently found roaming in fields, woods and pasture lands in the eastern United States. There is a different species in the southern states, and still others in the west, where they range well into Mexico. In our eastern box turtle, the high, rounded shell, which is almost a hemisphere, reaches a length of nearly six inches when the turtle is fully grown. These turtles are unfortunately addicted to traveling along the public highways, where many of them are crushed to death by passing automobiles. In fact, their extermination in regions bordering the busiest thoroughfares is a practical certainty. But it is quite unnecessary and very cruel to run over a turtle on the road. The thoughtful autoist who is also a Nature-lover will be substantially helping to preserve a very interesting and harmless species if he will pick up the box turtles which he finds rambling along the roadside, and release them again in some abandoned pasture or bit of woodland far from the dangerous highway.

Like the birds, all kinds of turtles lay eggs. The female box turtle seeks a spot where the earth is soft and fairly dry to lay her eggs. Very often the enthusiastic garden-makers who like to spade up their flowerbeds will come upon some elliptical whitish objects about one and one-half inches long and three-quarters of an inch

wide, buried in the soil about three inches below the surface, and usually in little groups of three to eight. Perhaps the gardeners have been too vigorous, and have destroyed most of them with their shovel strokes before investigating the mystery. The white objects are the eggs of the box turtle, kept as a pet in some vegetable gardens to feed on slugs and other undesirable occupants. Or perhaps the adult turtle wandered into the garden in search of tomatoes, lettuce and berries as well, —for to the turtle, mere property rights as to vegetables mean nothing at all.

Some turtle eggs about to hatch were unearthed in a garden last summer. They were brought to the laboratory and placed at once in a pan of moist sand, so that the process of hatching might take place without further disturbance.



COMING INTO THE WORLD

These are baby box turtles photographed when coming out of their shells

Although thin and brittle when newly laid, the shell of the eggs just before hatching became leathery and quite pliable, so that the surface could be indented by a gentle touch, unlike a bird's egg, which of course is always quite rigid. That the shell was very strong and difficult to tear was proved by the length of time which it took the little turtles to work their way out. The first notice of their coming was the appearance of a small rip at one end of the egg. This was made by the "egg-pip," which is a small, sharp, horn-like projection formed on the beak of baby turtles, as well as on some birds, while they are still in the shell, and used only to rupture the imprisoning walls which surround them. The egg-pip disappears shortly after the turtle or bird hatches, because afterwards it is never needed.

After the preliminary opening was made in the end of the egg, the little turtle's movements were almost continuous. He would move his head from side to side, and would even use the tiny claws of his forefeet to try to enlarge the opening through which he had to pass. After several hours of mild kicking and struggling, the shell was usually torn down toward the other end, much as a banana peel separates from the fruit beneath. By the next day, after several periods of alternate rest and activity, the baby turtle had gained sufficient strength to free himself of the shell, and to crawl away from the remains of his prison. The young turtle at this stage was covered with a moist albuminous substance which very quickly dried on contact with the air. When the little creature was turned over on his back, the placental suture in the lower part of the shell, through which the yolk of the egg once flowed to nourish the forming tissues, could still easily be distinguished.

ANT'S EYE VIEW

Under-side of a young box turtle

For a few days the main instinct of the newly-hatched turtles is to hide completely away. As they are not yet able to move the hinge of their lower shell or to retract their head and legs to escape danger, this may be a reason for their excessive timidity and seclusive habits when very young. As the turtle grows, his muscular power of course increases, and it is not long before he can shut himself as nicely as you please into the little box made of his own bones. But the hiding instinct is a dominant one with box turtles until they have actually reached maturity, for it is a fact that very few small or half-grown box turtles are ever found even by careful searching, whereas a full-grown box turtle can be met with often enough in a tomato garden or wherever succulent cabbage or lettuce grows unprotected by a stout board boundary.

Very young turtles show no distinct markings, their shells being a dull brown with a light spot in the center of each scale. The coloration of the partly grown turtles, while exceedingly variable, is very much clearer than in the old, or in the very young ones, for these little fellows are beautifully marked with an irregular or star-like pattern of yellow on every scale of the back, and the under shell is often deep yellow around the edges and dark brown in the middle. Often the yellow stars on the back are intensified to deep orange or almost to brick-red, and after a rain the little turtle looks very handsome in his brown suit with orange trimmings. In old turtles the marks are very dull and faint, because of the hard wear on the surface of the scales. Contrary to the popular belief, turtles are unable to shed their skin or renew scales, and a mark made upon the shell will remain for life if it is not actually worn away.

The age of a young box turtle can be told quite accurately by counting the number of ridges on a scale from the center outwards. At the time the turtle is hatched, the scales are already formed, and subsequent growth takes place around the margin of every scale. Each year at

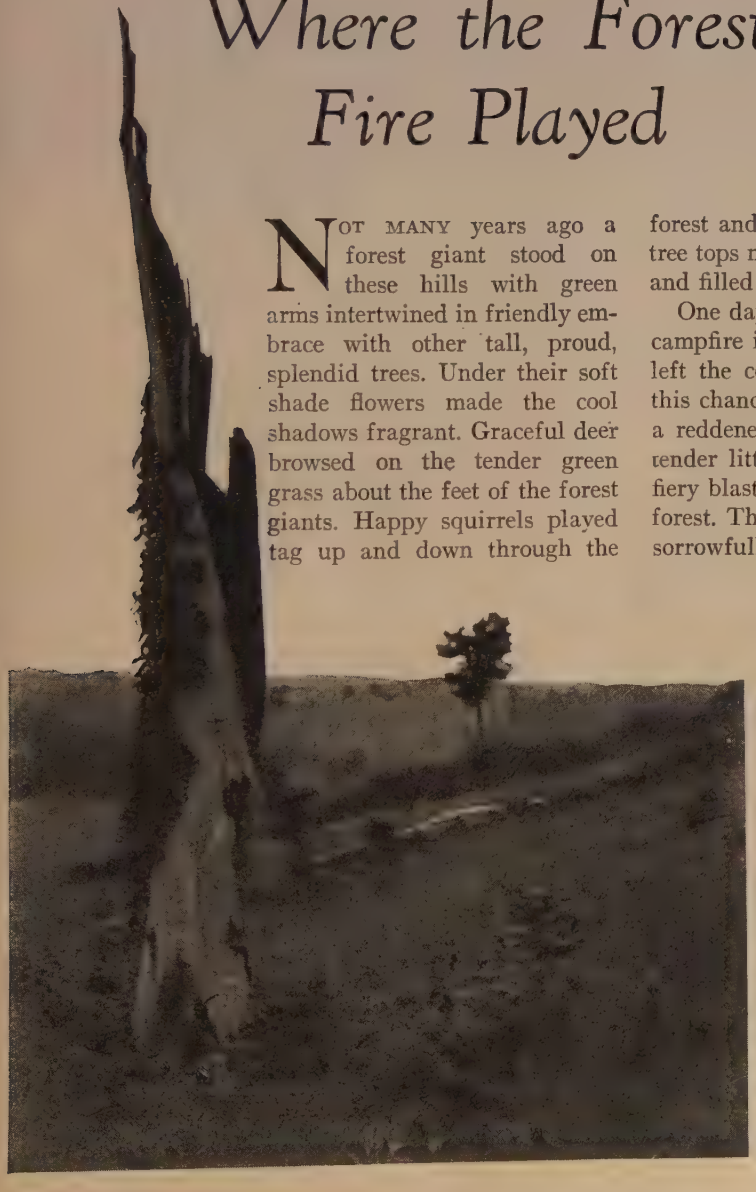
the approach of Winter the box turtle finds a favorable spot of soft earth, into which he begins to burrow until he is completely out of sight and also out of reach of the biting frost which holds the ground in an icy grip. Here in a state of absolute torpidity the turtle passes the winter in dreamless reptilian sleep. The heart very nearly stops beating, the circulation of the blood proceeds at a mere fraction of its usual rate, and breathing stops entirely. Growth also ceases, and when the Spring sun has finally brought a little warmth and renewed life to the box turtle in his subterranean retreat, he emerges to active life once more, with the record of his Winter's sleep etched upon his shell in the form of a little channel, from which the new growth begins. On box turtles up to twenty years of age, these ridges can usually be counted fairly easily, but after the shell has received much wear from many years of hard knocks and rough usage, the ridges are usually worn away and can no longer be seen.

The rate of growth in box turtles is comparatively rapid for the first few years, a turtle five years old measuring about three inches in length. But from this time onward the rate of growth is much slower. It requires from fifteen to twenty years for a box turtle to reach a fair size, and after that age the growth becomes very slow indeed. How long do box turtles live? No one knows just how long they can exist under favorable conditions, but some have been known to live over sixty years. The healthy adults are practically immune to danger from predatory animals owing to their hinged shell, but the eggs and the young turtles are hunted by skunks for food. Snakes have also been known to swallow the young turtles, and undoubtedly a great number of them die every winter because they have not burrowed deeply enough into the ground to escape being frozen.

But the worst enemy of the box turtle is undoubtedly civilized man, who without a moment's regret will set fire to a field of weeds and bushes to clear it of such rubbish,—at the same time clearing it all too effectively of the little wild creatures which had made it their home since long before man occupied the territory. The wheels of civilization move all too swiftly now-a-days, and it is a pity that so many harmless and interesting of Nature's creatures are sacrificed to speed and greed!

Where the Forest Fire Played

by Don C. Lyons



Not many years ago a forest giant stood on these hills with green arms intertwined in friendly embrace with other tall, proud, splendid trees. Under their soft shade flowers made the cool shadows fragrant. Graceful deer browsed on the tender green grass about the feet of the forest giants. Happy squirrels played tag up and down through the forest and chattered the gossip of the day. High in the tree tops myriad birds made their nests, fed their young and filled the air all day with gay songs.

One day a hunter, seeking the nimble deer, made his campfire in the valley, After awhile he went away and left the coals glowing. The fire, gleefully reveling in this chance, grew, and grew, and grew. Soon it reached a reddened tongue for the green pine needles, and the tender little leaves. They gasped and shrivelled in the fiery blast. All day, and for days, the fire played in the forest. The gay songs of the birds died in terror as they sorrowfully left their babies behind to perish. The deer and its fellows of the wild fled before the strange monster that ravaged their homes. Soon the forest was deserted to the dancing red tongues of the fire.

Tiring, at last, of its play, the fire left the shattered, blackened ruins of a once friendly forest. Never again would it be the home of wild things, nor would cool green thickets be filled with bursts of song. Only a fire-twisted skeleton of one of the forest giants now stands to mark the place where a proud forest fell to carelessness. For many years Nature has tried to heal this sore on her breast with wind and rain. Slowly a sparse green begins to cover all, a scrawny undernourished tree or two tries to grow. Man strives to use the land and puts a fence or two up to mark the limits of his domain. Soon a once great forest will become a forgotten memory because a man forgot.

H. ARMSTRONG ROBERTS

"Then in the valley, where the brook went by,
Silvering the ledges that it rippled from—
An isolated slip of fallen sky
Epitomizing heaven in its sum—
An Iris bloomed—blue, as if flower-disguised
The gaze of Spring had there materialized."

M. J. Cawein: "A Wild Iris".

H. ARMSTRONG ROBERTS

IRISES BEAUTIFULLY SET OFF THE GARDEN

With the exercise of taste and a little study many fine effects can be obtained in any garden

IRIS, *the Rainbow Flower*

by Dorothy E. Pletcher

FROM earliest times the iris has figured prominently in song and story. Throughout the ages poets and bards have consistently sung the praises of this exquisite flower. In the annals of Greek mythology one reads frequently of Iris, goddess of the rainbow, and, in fact, the word "iris" is Greek for "rainbow."

Mythology alone can not claim the iris, for History has it that the golden device which was on the flag of royal France, as far back as the fifth century until the downfall of Louis Philippe in 1848, was modelled after the iris. It is said that when Louis the Seventh of France joined the expedition of the Crusaders in 1147 he adopted the iris as his emblem, and that is how it came to be known as "Fleurs-de-Lois" or "Flower de Lois," Lois being the manner in which the early kings Louis signed their name. Later in English the name changed to Flower-de-luce, and finally, to Flower-de-lis.

Indeed, even prior to the time of these French kings, the Etruscans, who were a civilized people long before the foundation of Rome, employed the iris as a motif in ornament. In fact, even the Egyptian Sphinxes have a part in the story for the iris appeared constantly in their headdresses. In ancient times among the Assyrians, Egyptians and other peoples the iris was a symbol of such qualities as eloquence, power, success and wisdom. It was held peculiarly sacred to the Virgin Mary in Catholic countries and appears again and again in the religious pictures of the early masters.

From the shores of the northern oceans to the balmiest of seas, the iris blooms in a multiplicity of types and a maze of brilliant coloring that makes one dream of the splendor of the Babylon of long ago. Certain varieties of this lovely flower revel in bogs, some decorate the edge of deserts, others display their pretty flowers in lands with definite dry seasons, while hordes of them flourish with average

THIS IS KNOWN AS "MONSIGNOR"
One of the many beautifully-colored irises that are a delight to grow

conditions of climate and soil. Central and southern Europe and China are the centers of the original location of the iris, but it thrives on American soil as freely as any native plant.

The universal appeal of this flower may easily be attributed to a number of reasons, the outstanding one, perhaps, being that it makes the greatest display for the least amount of care from the gardener. As it may be procured in a variety of forms and colors equaled by few hardy plants, is tolerant of adverse conditions, suffers few onslaughts of insects and plant diseases, and is looked upon as being relatively permanent, it is not at all difficult to understand the popularity of the iris with flower-lovers and those who desire to beautify their gardens. There is no garden to which some may not be especially suited.

The botanists have rendered gardeners a service by classifying the various species in their natural groups. A knowledge of the species to which any particular variety belongs, and of the locality in which such species had its origin, is of great assistance to the prospective iris grower.

The first characteristic which causes a division among the wild irises is the nature of the plant—some being equipped with bulbs while others have rhizomes. The bulbous species are separated into two groups according to the sort of roots which come from the bulb, while the rhizome group is classified by the structural characteristics of the flowers and of the rhizome, which is an underground, rootlike stem sending out leafy shoots from the upper surface and roots from the lower side. The Beardless and Bearded irises come from the rhizomatous form. In cataloging the entire Iris Family, the botanist gives us five groups: Beardless, Oncocyclus and Regelis, Crested, Bulbous and Bearded.

The first group is extremely large and consists of many diverse forms. The Siberian and Japanese irises are the most common garden specimens of this group, the Siberian iris in particular being a member of a group of oriental species of small dainty flowers which have a way of endearing themselves to us. The Japanese iris as well is very lovely and is the only one of the Beardless group which produces flowers equal in size and vividness to the flowers of the Bearded iris. A large clump of this flower grown by itself in some conspicuous place on the lawn will never fail to draw forth admiration and praise.

There are three unrelated species of the Beardless class which are noteworthy because of their special characteristics: the Walter which grows in a soil rich in humus and bears slender lavender flowers late in June, forming a mat of foliage and making an excellent ground cover; the Poiret, a beautiful evergreen iris from the Mediterranean regions, its main value being for the South and Pacific Coast, because it flowers from November until March; and the Pallas, the most interesting of all three, which is very easily raised from seed and blooms in August and early September.

And then there are the wild irises of the South and those of the Pacific Coast, two other specimens of the Beardless family which are noteworthy, due to the fact that they grow naturally in wet places and flourish in an average garden soil. The Pacific Coast iris is a dwarf plant with beautiful tiny flowers of soft coloring.

Outside of southern California it is rather a hazardous task to raise the second group, the Oncocyclus and Regelis, which originated in Asia Minor, Palestine and Syria. These irises are similar in that they both need a drying in the summer which is accomplished by lifting the plant as soon as the foliage appears to ripen and storing the rhizomes in a dry condition until the middle of autumn. Many admirable flowers have been evolved from these two types.

Crested irises are strangely beautiful and two of this species, one of which is the delicate *Iris cristata* and the other the *Iris gracilipes,* should be in every garden. *Iris cristata* grows in the eastern part of the United States as far west as the Great Lakes in the North and the Ozarks in the South. It is a dwarf flower with creeping rhizomes, its leaves forming a carpet through which peep pale-lavender flowers flecked with white and orange, while the second type, from Japan, has yellow-green leaves and small, rosy, lavender flowers touched with yellow and white.

In the Bulbous class the Spanish, English and Dutch varieties are of most value to American growers. After years of experimenting on the part of European growers, they have evolved many color forms in the Spanish iris. It is a

slender plant with narrow leaves and flower stalks eighteen inches high, each bearing two flowers of an extremely characteristic shape. It seems that the Dutch species was discovered as a result of the experiments with the Spanish. Both the Spanish and Dutch irises are easy to grow in most regions, although they do not thrive where they are likely to be injured by frosts in the Fall. Because these flowers are of too delicate a structure they should never be used in landscape planting but must be planted in groups in the garden.

Practically all of the common irises are Bearded irises. This variety, so surprisingly easy to grow, may be recognized by its stout rhizomes, evergreen foliage and extraordinarily brilliant flowers, as many-hued as the rainbow itself. Due to a great deal of misunderstanding concerning the classification of these irises, there is now a tendency to group them by colors. For example, in beginning with the white varieties, there is a group in which are included the absolutely white ones; those which are white with some colored reticulations in the throat; some of white slightly tinted with color, nevertheless counting for white in the garden effect; and others which are faintly reticulated with color over their entire surface. Since there arises great difficulty in grouping those of lavender and its related shades, it might be interesting to note that in the iris there is no true blue, for there is always blended some red. For this reason the terms lavender and violet are hyphenated, and the classification has divided those closely related colors into two groups, the red-violets and the blue-violets.

THIS ONE IS CALLED "CHLORINDA"
A lovely iris to which a black and white picture can hardly do justice

In brilliancy of coloring the iris knows no rival. In range of color and number of tints it can not be surpassed and with each year's work of the iris specialist, more and more lovely hues are added to its triumphs. Judges at a flower show would require that self-colored varieties should have clear distinct colors, blended varieties the combination of harmonious tints, and bi-color varieties colors that contrast pleasantly.

Strange as it might seem, scent and color are closely allied, for the violet and sweet pea scent is associated with red and purple flowers while the vanilla and gorse scent goes with yellow flowers. Although many varieties are slightly fragrant, the most fragrant species are Delicatissima, Pallida Dalmatica, Fairy and Caprice. Those who are especially interested in the breeding of iris for scent might do well to consider the possibilities of the early Dwarf and Intermediate varieties as well as some species of the late tall Barbatas not yet bred in with the florist varieties.

Through a wise selection of varieties it is possible to have the iris garden in color the whole season. Make certain to consider the continuity of bloom before arranging the different types. In this respect the Intermediate iris is invaluable for it is used in making continuous the iris season between the April blooming Dwarf irises and the May and June flowering tall irises. For this purpose one should select a variety or so from Ingeborg, Ivorine, Blue Boy and various others which the obliging nurseryman will recommend. Usually the iris blooms but once a year, but in rare cases such types as Loreley, John Foster and Mrs. Alan Grey have been known to bloom in the Spring and again in the Fall.

Temperamental perversities of our rainbow flower require it to be cut while in bud and allowed to open in the house—that is, if one wants firm and gorgeous blossoms. Its flowers are most fragile and when in full bloom can not undergo much handling, for as Shelley once wrote, "The sweetest flowers are ever frail and rare."

Where shall we plant the iris? If we could arrange to have our flower moist during the growing season and dry the remainder of the year we would then have an ideal condition. Practically all irises need the sun although there are several which enjoy partial shade. The best location for the iris garden is on a slope to the South, where it may be sheltered from cutting winds. When planted near other plants it should be arranged so that its surface roots are not shadowed by foliage for the rhizomes are being ripened for the next season's flowering. In fact, the quantity of flowers the iris will produce will be in proportion to the amount of sunshine it receives, for the unusual way in which it withstands heat and drought is one of its outstanding characteristics.

All of the Beardless irises object to lime and prefer moist to dry situations, while the Bearded family, on the contrary, shows a marked preference for lime and shallow planting in sunny well-drained locations.

Usually fertilizers are unnecessary because of the fact that an extremely rich soil tends to result in a rank growth and very few flowers. Should the ground be exceedingly poor, however, a little bone meal may be mixed in. Some lime is necessary for the Bearded iris; usually a pint of finely-ground limestone to a square yard will be sufficient. It is preferable to use the lime before planting or late in the season when growth has almost ceased; nevertheless it may be applied during the growing season by saturating the ground with lime water.

JAPANESE IRISES

These are among the most common of the garden varieties

There are three methods of propagation of the iris: from seeds, by means of the division of the roots and through hybridization. Perhaps the best way of securing the species of the wild iris is by collecting the seeds which it produces. These seeds must be planted immediately after their harvest, and when the seed pods begin to turn yellow, they should be carefully watched. The seed is planted after it has been removed from the pod for several days and allowed to dry.

Nearly all irises can be increased by means of the division of the roots. Those of the Bulbous group divide, and the little bulbs around the base are removed and grown to flowering size. The rhizomatous variety, on the other hand, is easier to work with, since the iris rhizome grows along with annual growths until it produces its terminal flower stalk; on either side of the bloom stalk one lateral branch is produced and these grow on until they flower and produce branches.

August and September is the most effective time for transplanting. Obviously, early Fall is the time for this because it is then that the iris is nearly dormant, and it will afterwards form a root growth and become well established before the ground has time to freeze; hence it will be in excellent condition to bloom the following Spring. Should one plant later in the Fall it is wise to plant just before the Fall rains set in. But perhaps the very best time is immediately after the plant has ceased blooming, for then a new growth begins and the new roots are short and have sent out few rootlets. Certainly they then stand a slighter chance of being injured when the plant is taken up; the plant will have plenty of time in which to become firmly established and will bloom all the more freely the following Spring.

IRISES GRACE THE GARDEN POOL

Some Siberian irises growing informally by the waterside. They lend themselves well to such a setting

How shall we do our planting? First, cut away all decayed and dried roots, and shorten all others to about seven inches in length. Then dig the ground a spade deep, making certain to dig the hole slightly larger than it would appear necessary, to

allow the roots to spread at their full length. In the center, make a mound so that the ends of the roots may be put deep in the ground, with the top a trifle below the level of the surrounding surface of the mound. Then put the rhizome on the mound and press it down, after spreading the roots down over the mound, so that they might be better prepared to resist the frost. After filling the hole, pack the soil well around the roots and rhizome, put one or two inches of soil over the top of the rhizome and just enough water to settle the plant in its place.

When planting seeds it is well to remember that too much warmth and protection will assuredly kill them. Sow your seeds in the open and never under glass. Indeed you will find that they will germinate readily the first Spring after they are sown, at practically the same time when plants of the several species begin to grow again. Planting out seedlings is not quite so laborious when the ground is wet. Dig several holes where the plants are to be placed and then fill them with water; drop a seedling in each before all the water has had a chance to soak away and draw the earth up to the base of the leaves. The surface will then be dry and evaporation is much less rapid than if the seedlings are watered after planting. The seeds should be covered about twice their depth and may be planted very thickly.

In selecting plants from the long list of those available for use in the garden, one's individual taste is the logical guide in the matter. There is a flower for every location, for every type of ground, for every exacting flower-lover. One gardener might wish to choose that flower which puts forth a number of blooms at one time and makes one great display, while another would prefer that type which develops one flower at a time and has a long period of blooming. And then again, should one wish an Iris for cutting purposes—one that will make a splendid single stalk for a vase—those which derive their beauty from their exquisite details, such as Pancroft, Mme. Chovaut or Montezuma would be appropriate to choose from.

A garden composed entirely of irises is a strikingly beautiful thing and today there is a tendency toward such gardens. To attain supreme beauty and perfection in arranging this type of garden, it would be a good plan to keep in mind that in planting a garden, one is attempting to create a picture, an object of art, and here, as in the realm of art, one may show himself to be either a master or a mediocre dauber. However that may be, a realization of the infinite possibilities of iris culture presents itself at this time and it is absurd to suppose that anyone, once under the spell of the beauty of the iris, could do otherwise than create a garden of loveliness.

Let us plan an ideal iris garden. In arranging the border it is necessary to remember that certain colors carry differently than might be expected, while others do not carry at all. To illustrate: Quaker Lady, a mixture of buff, pink, and violet with yellow in the throat, when massed in the border does not carry well unless it is set off by some variety of a clear light color. On the other hand, Isoline and Merlin, both blended varieties, when used in masses, appear as pink-toned irises, although upon a close inspection they prove to be far from pink. The delightful Dwarf irises of both the Beardless and Bearded families, seldom exceeding a foot in height, are fascinating when planted in front of the border, in irregular patches rather than in formal edgings, while *Iris hexagona* and *foliosa* are best used as small clumps in the border.

For our ground cover we rely upon *Iris foliosa*, Walter and *Iris cristata*. Particularly lovely is the Walter which puts forth its delicate lavender flowers late in June.

Pictorial composition in our garden demands that there be a gradation of colors rather than alternations of contrasting hues, and it does not take long to see that grading through pale pinks to dark red-violets, or through pale lavender to dark purples, is decidedly more effective than a sequence of pink, lavender, and on and on in that fashion. In our mass planting of either light or dark varieties we introduce clumps of dark or light types just to give accent to the mass.

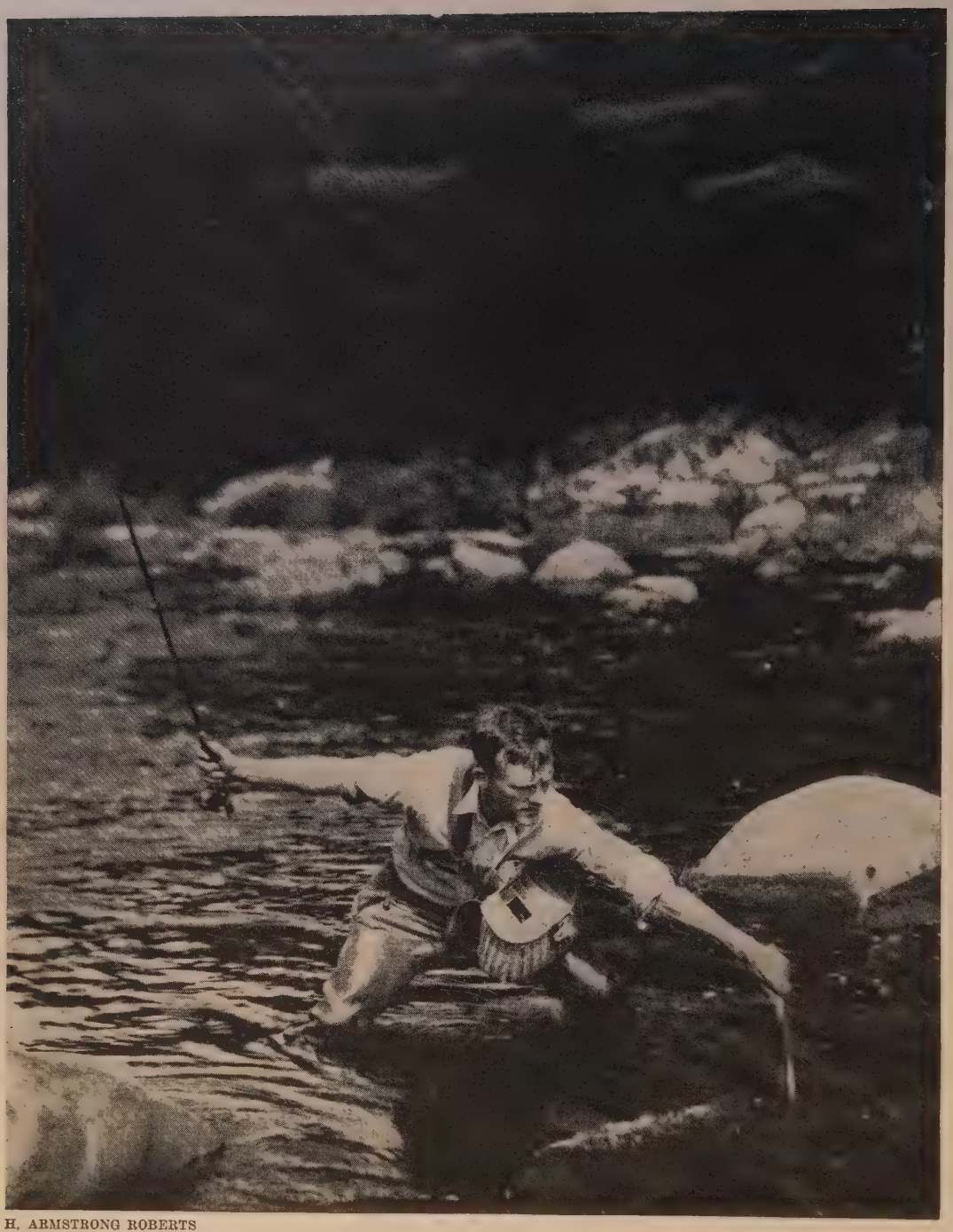
What is the effect of light and shadow on color? This question should be borne in mind when we select the site for the garden and decide the location of nearby plantings. Those gardens in which there are long shadows cast by distant trees both in morning and evening, with some shade from small flowering trees during the middle of the day, have the most lovely light effects. Such trees as flowering dogwood and Chinese magnolias are invaluable in shading the flowers from the noon heat.

One drawback to the feasibility of the plan for the garden composed entirely of irises is that there is only one season when the garden is aglow with blooms and that season is just about two months in duration, so that the rest of the time the stalks do not form a particularly inspiring landscape. We face this dilemma by introducing the "green garden"—a garden of iris foliage, supplemented by flowers which bloom in late autumn. Chrysanthemums are often used to fill in the picture; cleome, petunia and Chinese balsams also lend themselves particularly well for this purpose.

For landscape use, we plant our irises by the thousand, for in this way there is formed a scintillating maze of color—a veritable rainbow of hues. For this type of planting, sharp contrasts are less interesting than gentle gradations. In waterside plantings no varieties can surpass the English flag, native blueflag, Japanese and Siberian irises. In fact, all members of the Beardless group thrive in cool, moist conditions such as the banks of streams have to offer. The Bearded irises have not yet been thoroughly tested for naturalistic plantings, but the use of the blue form of *Iris germanica* on rural lawns would tend to prove that they could be successfully used.

Clear-colored flowers like the lavender or violet or the yellow, logically enough, all appear to greater advantage in masses than tinted varieties. Should the tint within each group of flowers be varied by grading the lavenders from the almost white varieties through all the intermediate steps to the dark purple, a decided interest would be added to the scheme of things.

The future of the iris is indefinable. What extravagant praise would the poets of the past have sung could they have but glimpsed the array of varieties and wonderful colorings which it is our privilege to enjoy today? It is just beginning to dawn upon some of us that an iris garden has greater possibilities aesthetically than any other, and with the blossoming of each successive Spring, more gardeners, fascinated by this realization, are rapidly joining the group of iris lovers.



H. ARMSTRONG ROBERTS

"Poor fish! With the sunshine on those freckled flanks! The scarlet slash distended, the broad caudal striking in futile thrust against the turf".

HOWARD FOWLER

FISH DENIZENS OF ROARING RIVER IN MISSOURI

The POOR FISH

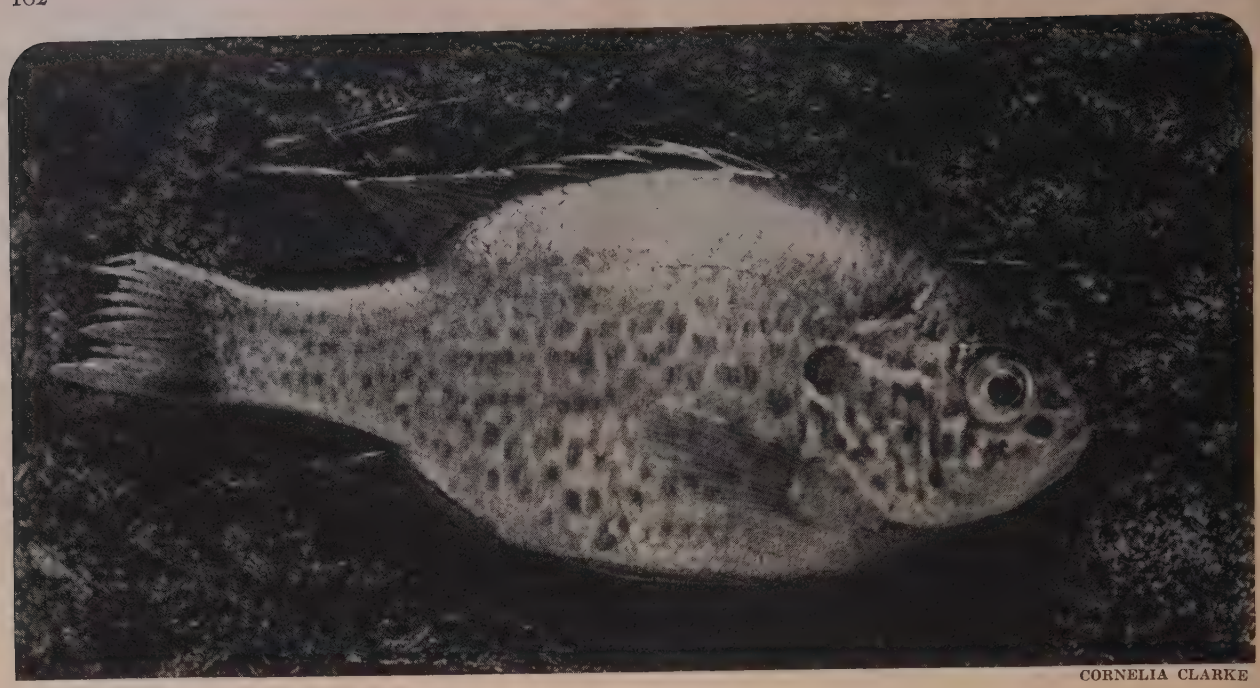
by Ben Hur Lampman

THERE is a slang phrase expressive of contemptuous pity for the witless. Thus we are accustomed to say, or some of us, one fears, "The poor fish!" This poverty of the fish is held to be a poverty of thought, quite as though the fish of all creatures is most feckless and inadequate. And the conclusion is but natural enough, when it is considered that we know little of fishes aside from their fixed habits, their times and seasons, the weight of them in the net, the swift and valiant thrill of them on the line. Of the life that accompanies us on our pilgrimage, they are the most mysterious; now glimpsed, now gone, now lost in revery as calm as stone—these dwellers in an alien element. Nor do aquaria reveal them at their best, for the captive is but the semblance of the free self, and with fish—as with wildings—it may well be that the better part of the spirit is yonder where are the old ways.

But poor in spirit and in wit they are not, captive or free, and our canard is without point, as any might vow who have watched them in their streams and lakes, or even in garden pools. It is more than probable that the greater part of all that has been written concerning the craft of game fishes, when they feel the barb, is worthless as evidence of the shrewdness of fish. The instinctive strugglings of the steelhead trout are little more than manifested instinct, however one may praise the valiance of the species. Its epic rushes are of terror and anger blent, but without conscious strategem. A silver arc above the eddy, a shimmering vibration of the muscular body—and we say that the steelhead is applying all his craft to free the hook. No craft is needed to instruct the leap that comes from pain, from something strange and hateful that is both tether and torment. It were as sound to say that we submit to reason the peril of the hornet that flies at our faces—as we do not. And of like merit are the tales that are told and written of stout-hearted, thoughtful bass that ran beneath the skiff on being hooked, to foul the line and so escape. These are the narratives of fishermen, and they lend splendor to the sport, but clearly enough they are not serviceable testimony. One must look elsewhere, if he will, for the more casual conduct that expresses the reactions, the motives, the intelligence of the fish. And none has looked in this way but have gathered wisdom through observation, and has risen from the brink of the pond, or turned from the rocks of the river, with a sure conviction of the wit of fishes and of their state as individuals.

The game fishes that are least accustomed to the shadow of man, or that may never have seen his shadow, soon learn of experience and by the fate of their fellows the nature of a lure, the hazard of a bait. I know that from this it will be reasoned, and for my confusion, that were it true then Walton's pastime would be gone forever—since all the game fishes of our continent, or most of them, dwell in waters that are fished and over-fished. But the strike of the fish in hunger, or in anger, is an instinctive strike, and is launched against competition either present or probable. Do not, therefore, ask too much of him, this creature whose every fiber urges him on to destruction. But mark well when his needs are satisfied, when the instinctive insistence of hunger is set at rest, how readily he perceives your designs against him; how he flouts the lure and mocks the angler. It is then that satiety permits him to become a thoughtful fellow, and gives scope to his fancy and humor to his mood.

Those fishermen who have observed their fish, as the strike was made, must sometime have remarked the fatal victory of instinct over wit; must surely have witnessed the reluctance of the doomed trout, that seemed to know the lure for what it was, and so retreated, then advanced, and then to its own sorrow made its strike. And of this matter, which I have seen illustrated many times, I recall as a particularly regrettable lapse the



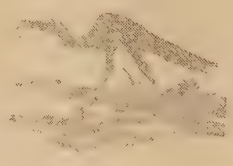
CORNELIA CLARKE

"THERE ARE FIVE SUNFISH, THE LARGEST CALLED MACTAVISH."

undoing of a certain cutthroat of Trail Creek. Now Trail Creek, as you may not know, is a mountain tributary of the hurrying Rogue, the river of which Zane Grey writes so lustily. It is born of the hills where blue grouse are, and if you fish it in spring, as some day you must, the deep throating of these birds will bear you company through the blue lupine, and down the slopes where furtive little orchids hide. There are cutthroats in Trail, many cutthroats, and the scarlet slash of the under-jaw is of that hue which justifies their name; a name, by the way, from which Dr. Henry Van Dyke labors in vain to relieve them. Many cutthroats, and these are glorious trout.

So we came to Trail Creek and fished down its miles, taking a trout here and a trout there, and glimpsing once a tremendous newt or salamander, one of almost unbelievable size, but that would not tarry for scrutiny. Presently the stream widened and ran smoothly shallow over brown rock, level as pavement, and there the lure wavered while we talked. This was not angling. It was indolence. There were cranes in the sky, crossing the dark forest, and their clear trilling rang down to us. And then, stealthily, craftily, very plain to see against the creek bed, that had neither stone, nor stick, nor lurking shadow, came the cutthroat. It was no proper water for trout, and I can only think that he was in passage when he entered it. Yet at a glance it was evident that he had seen the lure.

The trout paused, marking time with his vari-colored fins. At a distance of several feet behind the gently weaving lure he held his station for a long moment, reflectively, solemnly, in thought that seemed to spread a silence over the current. He was but poorly reassured as he approached, for he came on at a slow glide, punctuated by many pauses, ere his snout had the savor of the mystery. For another moment, tense and silent, he gave himself to thought. And then said he, this trout, as clearly as though speech were his, "I will have none of it!" and was off down-stream in such haste that the eye was baffled. But on an instant he was there again, and once more he paused reflectively, and conned his prudence, and knew the cheat for what it was. He came on. He retreated. He pondered. And with an impatience that was ireful, that bespoke scorn for his own fears, he cast himself recklessly at the lure. Poor fish! with the sunshine on those freckled flanks! The scarlet slash distended, the broad caudal striking in futile thrust against the turf! I have always thought of him regretfully. For he knew better.



I have read somewhere, and lately, that there lives beside a southern lake—in Louisiana, I believe—an elderly habitant who has made conquest of the bass and other fish that frequent the lake in great numbers. This story, one assumes, is subject to an immaterial discount for enthusiasm, and yet I like it well and am persuaded that in the main it must be authentic. True, he has tamed these wild ones with food, and they come to his gentle hand because it profits them—but it is so that savages of our own kind have been tamed, and I think it a credit to the fish that he is as reasonable as any bushman. When the good soul approaches the water his fish rise to goggle affectionately at their patron, and they will suffer him to stroke their silken sides, and there is considerable tumult in the jealous, eager contest for his favor. He vows that certain of them know their names, though I have read—and think—that fish are unmoved by any sound, and that it is folly to whisper when one plots their taking. And the names he has given them are the fond names of the motherland of his fathers, never seen by the old gentleman of the lake.

In fine, these wild fishes are as tame as the huge, bright goldfish of some pond in quaint Japan, where the pink-petaled cherry tree, that never bears fruit, blooms in the garden of the samurai and the tiny plot beside the hut. In Japan the goldfish flounder at your feet, lifting their rounded noses in supplication, and setting all the lily pads to waltzing—those times you visit them. Such magnificent

H. ARMSTRONG ROBERTS

"THE STEELHEAD FIGHTS TO FREE THE HOOK"

rivalry never was seen before! But generations of culture, of dependence on man, imbue these fish with tameness. We do not serve the truth, in any helpful sense, if we look for wit among the brilliant ornaments of a Japanese garden. They are the creatures of custom, and the hand that strews crumbs for their feast is no more than the shaken bough that drops its hapless tenant on a wild pond, for wild fish, in an immemorial garth. It were different if we had watched the taming, the response to culture, of the first of the kind. The transition from wildness to tameness, from distrust to confidence, is not, however, so protracted a process as one might think.

Not long ago I caught, with hook and line, some crappies—those minor, mottled cousins of the bass—and brought them to a garden lily pond. Here was no thought that they would readily respond to even the most generous and well intended advances, yet I confess that I had hopes of them. In a year and a day, perhaps, they might cease to associate with my shadow, my face above the water, my hand at its edge, the pain and terror they had known on a June morning. Fugitive they had lived, with the osprey over them, the glutton bass beneath, and fugitive they must remain for long and long. How little I suspected the secret tractability, the waiting faith, the all uncultured confidence of the green and golden optimists! Within the fortnight they were feeding from my hand.

It came about very suddenly, or so it seemed, and it was manifested more especially in two fish of the seven I held captive. I was accustomed to the silver flash that doomed a sinking worm, and to the immediate retreat beneath the lily pads; and on the tenth day they had seemed as wary as on the first, as fearful of my coming. And yet there was a morning when to my astonishment, for the conversion was apparently spontaneous, I saw two of the captives hopefully pacing my steps around the pond. They were following their jailer, and I vow that either fishy countenance wore a hopeful, prayerful look. Behold, I was deity; and though elsewhere I might cut a sorry figure, and be of small account, to these poor prisoners of the pond I was Providence, and greatness, and benefaction. I stooped to watch them, and the large, round eyes, grave and disturbing, tilted outward and upward as they paused beneath the giant's face—very evidently returning stare for stare.

These crappies fed at once from my hand, due introduction having passed, and gently, too, as though their manners were of the best. From that hour they were my friends, and very often I debated the liberties I had taken with their freedom and the lives of their kind. I debated these matters rather philosophically, for first of all I am a fisherman—but there is a queerness comes to your thought, and a strange tug is at your heart, when fish that were wild are wild no longer, but flow with graceful confidence to the immersed hand, and mumble at your fingers, and mimic the attack, and in dumb show entreat you to give them of your store. As I have said, two of the captive seven—and frequently I have noted such individualism among other fish—quite laid aside their fears, and would move but laggardly when I touched them, and were always waiting for my footfall; for so I think they knew my coming. If a worm was held two inches from the surface they would leap to take it, though at a somewhat greater distance, while evidently watching the morsel, as their agitation betrayed, they sensibly refused the attempt. These crappies taught me anew that wildness is more often the child of present fear than the offspring of any ancient instinct. And they gave testimony that individualism, which is but another term for character, runs through Nature as a persistent motif, and may be found where

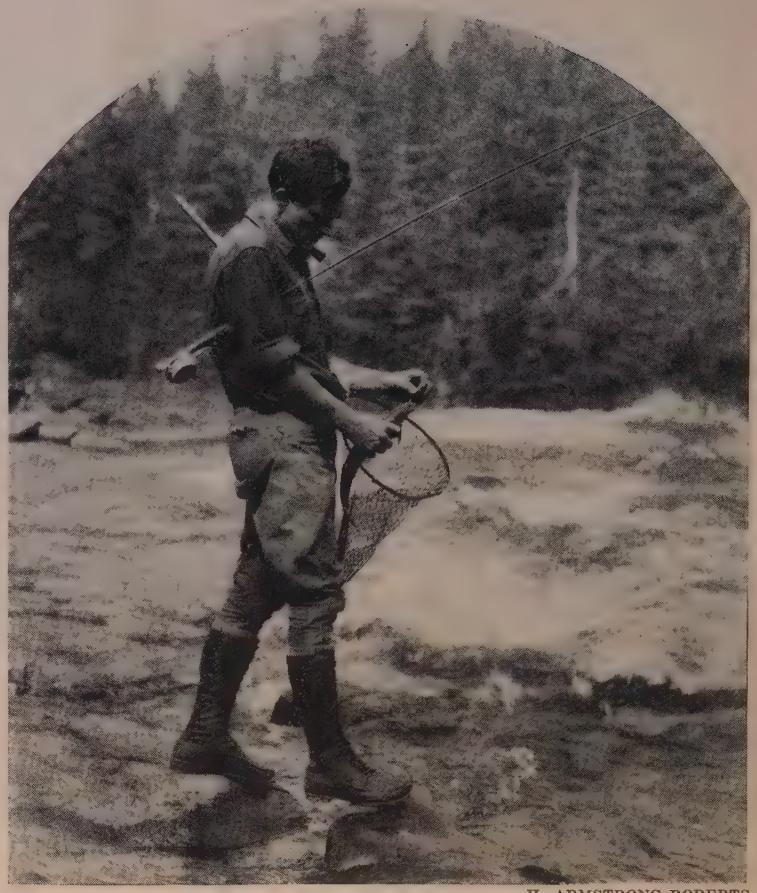
W. L. FINLEY & H. T. BOHLMAN

IN SHALLOW WATER

one had not at all ever hoped to discover it.

I cannot think that the good Longfellow had lately angled for sunfish, or that he kept them in a garden pool, when he wrote those lines which tell of Hiawatha's fishing. It was sturgeon the hero fished for, and, as must always be the case with those whose hearts are set on a certain fish, another and lesser species vexed him with its hunger and its tuggings.

> Slowly upward, wavering, gleaming
> Rose Ugudwash, the Sunfish;
> Seized the line of Hiawatha,
> Swung with all his weight upon it.
>
> "Esa! esa! shame upon you,
> You are Ugudwash, the Sunfish;
> You are not the fish I wanted;
> You are not the King of Fishes!"

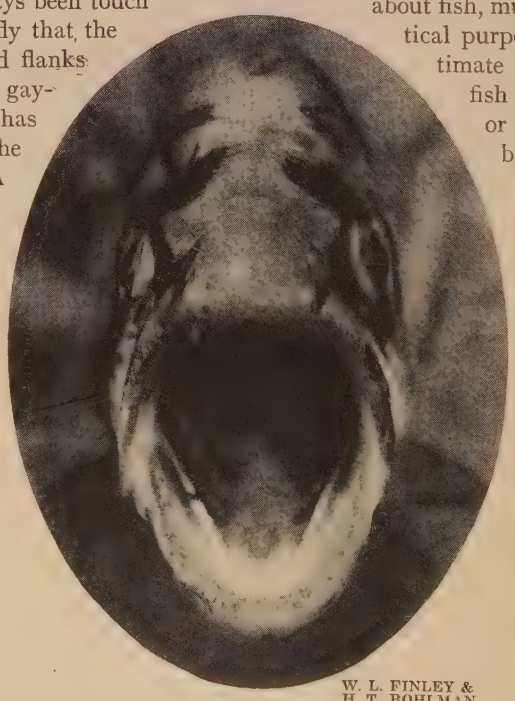


H. ARMSTRONG ROBERTS

"TAKING A TROUT HERE AND THERE"

The sunfish in my pool do not strike after this fashion. Even a trout might go hungry among them, thin and hungry, so instant and brilliant is the foray of these fish. They are pumpkin-seeds, beloved of boyhood—pumpkin-seeds, as radiantly enameled as a jewel of Cathay; pugnacious, bristling, and alert. Their comrades the goldfish are by turn jesters, dreamers, strollers or sages; but the sunfish are hunger with fins, hunger in fine raiment, and very serious and deadly in a small way. There are five of the clan of Ugudwash in the pool, and the largest of the five is called MacTavish, for no reason whatsoever, save that he is different and so has earned a name.

These sunfish, too, grew tame in a brief period of friendly care, and would soon consent to take worms from the hand—though they did not, like the crappies, linger in the taking. They made their strike and were away with the booty. It has always been touch and go with Ugudwash, so briefly that the intricate pattern of his head and flanks is as the riddle of some strange gay-hued bird that passes. That is, it has been so with all except one of the five, and he the MacTavish. A matter of but a few weeks sufficed to win the esteem of his four fellows, but it was more than a year before we had aught save an occasional glimpse of the dour one. At sight of you he would—and does—bristle with seeming anger, and the ten spines of his dorsal fin rise to quiver threateningly. Then backward, with his front to the foe, MacTavish retreats to the lilies. What memories prompt him to this hardness of heart, this truculent wariness? What elder instincts? Whatever it is that he remembers or feels, it is not shared by the others, who have quite forgiven or forgotten. And so MacTavish swims apart, in his dourness, as the two crappies swam apart in their winsome gentleness. Why, it is possible for fish to be real characters! Indeed, they are individuals, and I can but think that there are cravens and paladins among them, fools and savants, statesmen and commoners.



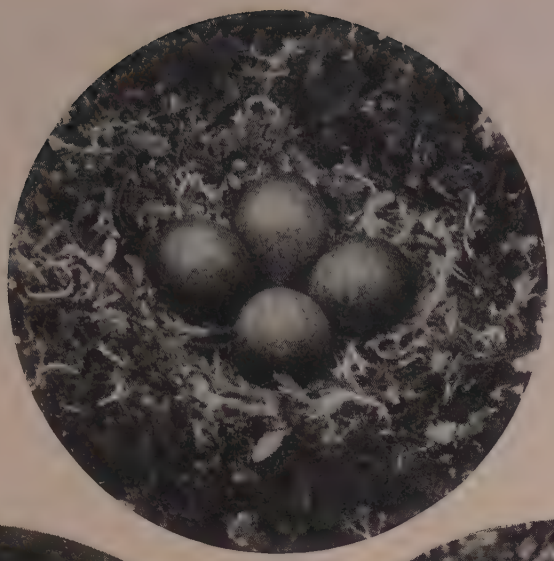
W. L. FINLEY & H. T. BOHLMAN

A HEAD-ON SNAPSHOT

Whoever has watched them will have learned much about fish, much that is immaterial to any practical purpose but that is precious as all intimate revelation, however minor. A catfish will slouch at ease against a root or stone, his tail flattened against the bottom, his rounded body leaning negligently on its support. The pose is that of a reflective lounger. The Rocky Mountain whitefish, that is erroneously called "grayling" by anglers, will work with crafty patience at the hook, having obvious caution as concerns the barb, until the bait is freed and he may take it safely. And a fish that is fed, particularly if it is a game fish, will tell you plainly that it knows your crude deceit, though the leader is of finest gut and the hook diminutive to disappearance. And so, I am moved to ask, are they, on this evidence, so poor of wit as to merit our ridicule? Not they.

THE ELUSIVE EGGS
(Right)
The nest of the surf bird sought for many years

THE MATERNAL MALE
(Below)
The father bird faithfully incubated the eggs



ARE THEY ALL RIGHT?
(Below)
The male carefully inspected the eggs when he returned to the nest, turning them over tenderly with his bill

IN QUEST of the SURF BIRD'S NEST

by Joseph Dixon

of the University of California

For a century and one half ornithologists have known the surf-bird. They have traced the flutter of its gray, black-speckled wings in migrations rom the stormy reefs of Magellan Straits to the northern undras of Sitka, Alaska. Here the trail was lost. None new where it went to build its home and rear its young. There was no record of its nest and eggs having been een. Thus the finding of the habitation of this bird of ystery had become a sort of Holy Grail among bird-en. They cherished the secret ambition to find the nswer to the riddle. I confess that this allure played no mall part in the five pilgrimages I have made in the ast seventeen years into Alaska. But let us go back to e beginning.

To introduce the surf-bird itself, we might remark at its scientific name, *Aphriza,* derives from the Greek *phros,* meaning sea-foam, and *zao,* I live. How apt a ame for these sandpiper-like birds who love the out-ing reefs and rocks where the flying salt spray often reaks completely over them! During the Winter, as well s during the Spring and Fall migrations, the surf-bird strictly "a dweller by the sea", being rarely or never ound away from the coast. This fact led certain men believe that the species must also breed along the coast in the far North, a theory which led them astray.

On previous trips I had gone over nearly all of the coast line of Alaska. By my own experience as well as by the work of others, I concluded by a process of elimination that the surf-bird must nest somewhere in the mountains of central Alaska. The natives of Alaska had a legend that it nests "on the bare mountains in the interior". While I do not make a practice of believing all the Indian legends that I hear, I have found much truth in many of them and so I cherished this one.

This was the surf-bird situation in the spring of 1926 when, through the joint support and sponsorship of Col. John E. Thayer of Lancaster, Mass. and the University of California, the writer with Mr. George M. Wright as companion, set out upon a three months' study of the birds and mammals of the Mount McKinley district of central Alaska. At the same time we again took up the long, long trail of the surf-bird.

Upon our arrival at Mount McKinley Park in May we were kindly received by Superintendent Karstens, to whose help is due much of our success. Most of the Park in which we worked is above timberline, which, on the north slope of the Alaska Range, rarely extends above three thousand feet. Mount McKinley extends

seventeen thousand feet above timberline and is mantled in white the year round, but on the lower ridges, on the tundra plains and on the exposed river bars, the snow was largely gone by the last of May. However, even the willows had not yet started to leaf out when we arrived.

No trace of surf-birds could be found along the river bars and lower slopes so we directed our search to higher ground. We continued our search upward until we were stopped by snow-slides that were too steep to cross or by unscalable cliffs. On May 28, toward evening, Mr. Wright's attention was attracted by a grayish bird sneaking along over the rocky ground. As he watched with binoculars it disappeared; but upon his going to the spot where the bird was last seen, he almost stepped upon it sitting on its nest and four eggs. His were the first human eyes of which we have written record, to rest upon the nest and eggs of this rare bird.

THE LAND WHERE THE SURF-BIRD NESTS

Mountain sheep grazed daily about the nest shown above, but the bird protected its home in its own peculiar way

The surf-bird's nest was located on a barren rocky ridge one thousand feet above timberline. The nest was out in the open with nothing to protect or to conceal it. As a matter of fact it was almost "out in the street" since it was within a foot of a well-traveled trail of the white Alaska mountain sheep. The four eggs were deposited in a natural erosional depression which formed a natural nest. The bottom of the nest was composed of dead leaves which scarcely covered the bare rock. A few bits of grayish green dry lichens amid caribou moss were used to line the nest. The eggs in the nest blended so well with the reddish brown tundra moss which surrounded the home that it was difficult to see them at a distance of ten feet.

Fearing that some of the numerous mountain sheep might trample the nest and to learn as much as possible about the home and domestic life of the surf-bird, we decided to stay all night near the site. By ten o'clock it was snowing. The bird on its nest merely fluffed out its feathers and let the rain and snow run off its back. We had no feathers to fluff and were soon wet to the skin and shivering. Darkness only lasted two hours of the night. At four o'clock in the morning, a female mountain sheep came silently, like a ghost, out of a great white swirl of chilly mist. When she was about to step on the nest the sitting surf-bird suddenly "exploded" right in the astonished sheep's face. The sudden noise and the flash of the white on the bird's wings and tail caused the sheep to jump back quickly. We found later by repeated experiment that this was the surf-bird's regular way of defending its nest from being trampled by both sheep and caribou.

When frightened off its nest the surf-bird would utter a plaintive "tee-tee-teet" which was repeated two or three times with short intervals between calls. It would run off a few feet, fluff out its feathers like a "setting" hen, and then try to lead us adroitly away from its precious nest. If we retired somewhat it would hustle directly back to the nest. In going to the nest the bird was careful not to step directly upon the eggs. It would stop at the edge of the nest, reach out with its bill and turn over the eggs. The bird then fluffed out the feathers of its breast and, sitting down gently, slid forward with great care until the eggs were completely covered.

During the sixteen hours that we watched at the nest the female surf-bird did not appear once. In this known instance the male did all the incubation. All of the males which we collected for specimens during the breeding season had egg pockets or bare places on their breasts from sitting on their eggs. None of the female birds examined at this time had such "incubation patches". We are therefore of the belief that the female surf-bird is thoroughly modern and that the male has to do most of the housework and other domestic duties. One man suggested that perhaps that was the reason why he had sought solitude and tried to hide in the remote mountains of distant Alaska!

AMONG *the features of the October issue will be a useful article on Growing Flowers from Bulbs; an interesting Bison story by Will C. Barnes; an entertaining account of our friend the Ladybird Beetle; and other helpful and readable features.*

The VANISHING CHESTNUT

by Otto Wilson

DRAPED IN MOURNING
Withered leaves cling after the fungus has done its work

STARTLING indeed would it be to read, some fine morning, headlines like this: "Americans routed all along the line! Orientals advancing irresistibly! Devastated area steadily widens as triumph of invaders is complete!"

It sounds, to say the least, improbable. But if we start to explain, "We mean chestnut—" no lover of trees will need to have us go further. He will agree at once that the sensational headlines are sadly true. He knows that American forests of chestnut, in the last twenty-five years, have been steadily giving way before an all-conquering invader from the East. The enemy is the bark fungus known as "chestnut blight," and it has gone calmly on with its work of destruction in spite of every effort to stop it.

When the history of the American forest comes to be written no chapter will be more poignantly vivid than that headed "The Tragedy of the Chestnut." It will tell how in a single generation a far-spreading stand of a most useful tree was almost utterly wiped out. It will show that whatever the magnificent achievements of men's brains may have been in combating the hostile forces of Nature we still have far to go before we can control even some of the well-known agencies of tree destruction.

Twenty-five years ago groves of native chestnut and cultivated orchards covered the Appalachians and adjoining regions all the way from New England to northern Georgia. They yielded tasty nuts for men and animals. Their tannin was particularly prized for preparing heavy leather. Poles for telephone and telegraph lines, posts for fences, railroad ties, and a coarse-grained but inexpensive lumber came from trunk and limbs. For unnumbered centuries the groves had flourished and nothing seemed to threaten them but the woodsman's axe.

But the seeds of death were already in their midst. At some time, nobody knows just when, some observant traveler had conceived the idea that a species of chestnut growing in northern China would make an interesting addition to our tree citizenry. He packed a number of seedlings and shipped them to this country. But when he selected

SHORN BY THE BLIGHT
A dead chestnut tree victim of the baffling disease

U. S. DEPT. OF AGRICULTURE

PROSPECTIVE IMMIGRANTS

A grove of old Chinese hairy chestnuts in Chihli Province, China, their native land

his little trees, no doubt as casually as he would select some article of food on the market, he all unwittingly swept tens of millions of dollars from American pockets and signed the death warrant for hundreds of miles of fine forests.

In the bark of one of those seedlings rested a little patch of fungus. It may have been no larger than a dime, but it carried greater possibilities of destruction than a dozen tornadoes or floods.

Let us glance at this fungus. It is interesting botanically, however injurious it may be economically. It establishes itself in the inner bark, and sends its strands like roots pushing outward in all directions. At the surface they appear in the shape of pinhead pustules, which bear two types of spores.

In damp weather the mass of spores in some of these pustules are squeezed out into long curling tendrils. They are sticky and they adhere to birds and insects, who may carry them long distances. The other type are arranged in groups of eight two-celled spores, each group contained in a thin sac. These sacs in turn are held in one of many small structures whose mouths are tiny openings at the surface of a pustule or at the end of a hair-like tube projecting from it. Through these mouths the sacs escape and burst, throwing their spores into the air to be carried whither the wind may will.

As soon as the infected tree from China was again set into the ground the fungus upon it began sending out its tiny spores into the surrounding woods and fields. Most of them of course died. But here and there some of the little messengers found a chestnut tree and an opening in its bark, and proceeded to establish a new and thriving colony of *Endothia parasitica* Murr. Again and again the process was repeated. From tree to tree the infection spread, and wherever it found a foothold its victory, in due course, was flaunted to the world in the shape of withered leaves, and eventually a gleaming, bare, dead limb or trunk.

It was not until 1904 that American botanists discovered that this serious menace to the chestnut growth of the country was at work. It made its bow to the public in Bronx Park, New York. From that point as a center it soon ranged northeastward through New England, westward toward the Alleghenies, and southwestward through the Middle Atlantic states. The alarmed forest experts watched the outer line of its advance spread farther and farther, much as the whole world a decade later was to watch the red battle line move back and forth across the map of Europe. But the battle line of this Eastern invader did not move back. It sent its forces ever forward in an irregular line, using birds, insects, and the timber shipments of human beings themselves to throw outposts ahead often a hundred miles or more and establish new centers of infection.

Of course the human beings concerned did not take all this lying down. They fought the new foe with all the weapons in their arsenal. They tried fungicides, sprays of many kinds, injection of chemicals, destruction of infected trees and groves, and about everything else that promised results. They made an intensive study of the chestnut-blight fungus and learned many things about it, but not how to stop its growth. The State of Pennsylvania was particularly active. It held conferences, appointed a commission, and carried on a campaign over several years, at a cost of more than half a million dollars. The only result was to check the

U. S. FOREST SERVICE

ONCE PLENTIFUL, NOW RARE

Trees like this were common in Maryland a few years ago but the blight has left few of them

progress of the blight for a while by watching for new centers of infection and cutting out the diseased spots wherever they appeared on the trees. The main line of infection might indeed have been held up by a drastic destruction or costly surgery of each infected tree, but it is questionable if even that would have done more than delay the onward march and it was considered far too expensive to try out.

To-day the chestnut forests north of the Potomac and east of the Alleghenies exist only in memory. There are still wide areas of chestnut in the southern Applachians, reaching northward through Tennessee, Kentucky, West Virginia, and eastern Ohio. But they are certainly doomed. The infection has now reached the southern limit of commercial chestnut, and the withered leaves and dead limbs are appearing more and more frequently throughout the western areas. In a few years more the last grove will have yielded, and the original American chestnut, for all practical purposes, will have vanished into oblivion.

A NATURALIZED AMERICAN
A Chinese hairy chestnut tree growing successfully in American soil

A gloomy picture? Yes, no doubt. But I think I see a multitude of readers twitching impatiently. It is not the American habit, particularly in this enterprising Twentieth Century, to revel in tragedy, sylvan or any other. Our instinctive reaction comes in the form of the question:

"Well, what can be done about it?"

A good deal can be done; has been done; is being done. Baffled in their first line of attack, the search for an effective fungicide, the botanists have for many years been concentrating on the problem of finding or developing some species of chestnut which will resist the blight.

U. S. DEPT. OF AGRICULTURE

MAY SUPPLANT OUR NATIVE CHESTNUTS
Burr and nuts of the Chinese hairy chestnut, perhaps the best substitute for our own doomed species

They have had their far-ranging explorers in Asia and other lands seek out chestnut species which promised to be immune and send samples to Washington. They have established an experimental orchard at Bell, Maryland, where promising species are cultivated and experiments in hybridization carried on. Through a special appropriation of the last Congress they have now been enabled to make intensive studies abroad, and an expert has recently sailed for Japan to spend two years or more in an exhaustive investigation of promising species in that country.

So far the best substitute found for American chestnut is probably the Chinese hairy chestnut, *Castanea mollissima* Blume, a tree which grows to a height of forty to sixty feet in the forests of northern and central China and bears a nut very much like that of the American chestnut. There are many varieties, some of which are highly resistant to blight.

The Department of Agriculture does not hesitate to recommend that farmers set out trees of the Chinese hairy chestnut. It is largely through these individual plantings on separate farms and through more extensive plantings in National Forest reservations that the hope for rehabilitation of the

chestnut forests lies. There is no possibility of using blight-resistant trees to replace more than a fraction of the wide forests that have been destroyed, as their place is already taken by new growths of oak and other forest standbys.

In this work of renewing the life of the American chestnut the tree lovers of the East can take a hand. The Department, among other measures, is trying to keep track of the trees which have lived through the long, murderous barrage of the blight. If you know of any such, you can help out by writing to the Department or to Nature Magazine, and the tree or trees will be listed for further observation as to their immunity to blight.

Is there a moral to "The Tragedy of the Chestnut?" Well, there is, after a fashion. It focuses attention sharply on that too little regarded activity of the government, the maintenance of a rigid plant quarantine. Had such a quarantine been in existence a generation ago no doubt our chestnut forests would still be green. More broadly it reminds us that all these manifold new activities of our busy modern life bring new dangers in their train and make necessary safeguards unknown to more primitive times. We can make the land a garden of exotic growths if we will, vegetable or spiritual, but only at the cost of a watchfulness which our grandfathers found unnecessary with the native wealth they had.

A CYNIPID MAGICIAN

and the Spiny Rose Gall

by A. B. Champlain

HAVE YOU SEEN THIS ON WILD ROSES?

It is a gall, not a blossom, and has an interesting story that is told in the article

All who have used their eyes when out in the country are more or less familiar with the curious excrescences called galls which appear upon the leaves, branches, and even roots of trees. The spiny rose gall of the wild rose is one of the thousands of abnormal growths found upon various plants. This, and a vast number of other galls of innumerable forms are produced by a group of remarkable insects called, scientifically, Cynipidae, and popularly known as gall-flies. They belong to the same order as wasps, bees and ants; also to the related wasp-like parasites called ichneumon and chalcid flies which attack and live on other insects. Most of the Cynipidae, however, are parasites upon plants rather than animals.

Anyone who is at all acquainted with wild roses knows that a rosebush has no right to have several or a cluster of these spherical, prickly galls growing on the twigs. Averaging three-eighths to one-half inch in diameter, these peculiar growths are covered with spine-like processes as long as the diameter of the gall itself. They are soft and of a light green color in summer time, sometimes with a reddish tinge, and brown and harder in the winter.

If a spiny rose gall is cut open it will be found to consist of a soft juicy substance resembling the pulp of fruits. In the very center of this mass there is a hard globular cell of woody texture that contains the larva or grub of the gall-fly. This maggot-like creature is whitish in color, very fat for its size, and curved so as to fit in the cell which answers at once for board and lodging. Since hatching from the egg, it has by continuously eating made for itself this little home. At the same time the plant cells, stimulated by the irritating presence of the parasite or by the effects of some fluid substance exuded by the creature, have grown abnormally along with and around it, thus forming the gall. The physiology of gall formation is one of Nature's undiscovered secrets. Just how they are formed and why the curious shapes and forms are each characteristic of an individual, is a moot question. There are many theories but no definite solution to these curious phenomena.

At this time the question naturally arises as to the manner in which the egg was first placed there. The original puncture is lost with the abnormal growth of gall tissue, and the growing larva must be able to respire by means of the oxygen which is given off by the living plant. By continuous observation we may discover this secret.

As a general rule, the larva or grub remains in the gall until it assumes the perfect or adult form known as the gall-fly, and then gnaws its way into the open air to fly away. It is at this time a small red and black wasp-like insect, slightly over one-eighth of an inch in length, with four wings, the latter having very few veins. The female gall-fly is concerned chiefly about egg laying. In this case the wild rose is the only plant that is suitable to her for this purpose, for she is *Rhodites bicolor* and her trade mark is the "Spiny Rose Gall." She flies into Nature's garden in search of wild rose bushes. When the mother gall-fly is ready to lay an egg, she pierces the plant tissue with her egg-laying apparatus or ovipositor and inserts an egg into the wound. This process may be repeated a number of times, and from each egg the larva or grub will hatch, with the formation of "Spiny Rose Galls" as described and as shown here.

H. S. BARBER

THE CARDINAL FLOWER

It adds a touch of flame to the moist summer meadows and needs protection

Friends in Need Among Our WILD FLOWERS

by P. L. Ricker

President
National Wild Flower Preservation Society

C. R. SHOEMAKER

SPOTTED WINTERGREEN

Its waxy-white flowers are found in the woods amid pine and oak leaves

EACH SEASON not only produces its characteristic flowers, but in a measure characteristic families and colors. In the Spring the whites and blues predominate, the latter often verging on the purple and violet, with a few yellows. The reds and yellows become more common towards Summer and, as Fall approaches, the yellows color the landscape, mingling with numerous violets and purples, mostly of the aster or composite family. These seed so freely that they rarely need protection. It will be noted, too, that the greater part of the Summer and Fall flowers are of the open fields, better adapted to withstand the hot dry weather, while a large portion of the Spring flowers are those of the more or less open woodlands and more often need protection.

Most of the families with attractive flowers needing protection have also a fair proportion that may be picked more or less freely with little danger of extermination. Three families, however,—the lilies, orchids and gentians,—almost without exception are urgently in need of protection and because of their scarcity in most places are more generally sought than any other flowers. The abundance of flowers, unless seed and root habits are well understood, is not a guide to their availability for picking. A few years ago a news writer, vacationing in northern Michigan, discovered an abundance of the showy ladyslipper and became so enthused over this find that he wrote an attractive article about them for publication, urging his readers to organize parties to hunt for them and give prizes for the one bringing in the most flowers. Fortunately the article was sent to the writer before publication, and, with the author's consent, modified in its objectionable parts. This same flower was formerly so abundant near one of the old colonial Massachusetts towns that it was extensively used there for many years for church decoration, with the result that the constant and nearly complete picking of the flowers has resulted in its practical extermination in that locality.

Often nurserymen specialize in these rare flowers and have collectors in many parts of the country who do not hesitate to enter any property and collect every plant in sight when an order is received. Occasionally these orders are for as many as one thousand plants of one kind during the filling of which several localities are likely to be depleted. A striking departure from this practice by dealers has been noted in an agreement between two New England dealers not to collect certain rare orchids from a little known locality for ten years.

It is to be hoped that other dealers will recognize the danger of extermination of some of

E. T. WHERRY

THE YELLOWISH GENTIAN

These greenish-yellow to blue flowers are found in moist soil and urgently need protection

RHODORA—*Rhodora canadensis*

INDIAN PIPE—*Monotropa uniflora*

WHITE POND LILY—*Castalia odorata*

Dwarf Larkspur—*Delphinium tricorne*

Showy Orchis—*Orchis spectabilis*

Moccasin Flower—*Cypripedium (Fissipes) acaule*

the rarer species and collect them in moderation until they have had an opportunity to increase, which they will do in nearly every locality if protected. Laws may be enacted for their protection, but they are difficult, if not impossible, of general enforcement until the public has become much more generally educated to their need for protection and to appreciate the desirability of keeping our woodlands, fields and roadsides attractive to the motorist and pedestrian. In some sections of the country Nature Trails are being laid out by various Nature and hiking organizations, attractive or interesting plants or other Nature objects along the trails labeled with linen tags marked with india ink, and directions for following these trails published in the daily papers. This is doing much to stimulate an interest in walking with an object and there are comparatively few abuses resulting from making known these trails when special attention is called to the plants most in need of protection.

ONE OF THE LILY FAMILY
This is the nodding lily and is found from coast to coast

The moccasin flower, *Cypripedium (Fissipes) acaule,* of the orchid family, also called pink, or stemless ladyslipper, is found sparingly during May and June in sandy or rocky oak and pine woods and occasionally bogs from Newfoundland to Ontario and Minnesota, south to North Carolina and Kentucky, reaching an altitude of 4,500 ft. in Virginia. This species is distinguished from all others by the absence of stem leaves, those present forming a rosette at the base of the flower stem. About ten other species with leafy stems and white, pink, brownish or yellow flowers are about equally divided between the eastern and western states. The generic name is derived from the Greek words for Venus and sock. The roots of several of the ladyslippers are extensively collected for medicinal purposes, particularly in the mountainous sections of North Carolina, where their existence is seriously threatened in many places.

The showy orchis, *Orchis (Galeorchis) spectabilis,* is found from April to June in rich woods from New Brunswick and Ontario to Minnesota south to Georgia, Kentucky and Nebraska, ascending to 4,000 feet altitude in Virginia. Only one other species of more northernly range and extending west to the Rocky Mountains is known from North America. The fleshy root stocks are sometimes collected and dried for medicinal purposes and are known in the drug trade as Salep, but most of such material collected is from European sources and it is used much less than formerly.

The sweet-scented white water lily, *Castalia odorata,* is found from June to September in ponds and slow streams from Nova Scotia to Manitoba and south to Florida and Louisiana. The water lilies by themselves form a family of that name and grow from long, thick, fleshy roots, buried in the mud with very long slender stems and leaves floating at the surface. About eight species are known from this country, one of the smaller northwestern species extending to Asia. Pink and reddish forms are often found. Some of them are extensively cultivated in both small and large artificial ponds made for that purpose, and make a most attractive addition to the home water garden. The ponds and sluggish streams where they grow give an opportunity for the decaying vegetable material to make the water of just the right degree of acid reaction to favor the best growth. The roots grow quite readily when transplanted and a depth of from two to three feet of water is preferable. In some northern ponds they are becoming rare but whether from too much picking or from disturbing the roots is uncertain.

The dwarf larkspur, *Delphinium tricorne,* of the crowfoot family, is found from April to June in open woodlands from Maryland to the mountains of Georgia and west to Minnesota and Arkansas. About twenty-five other species are found, mostly in the western states, the majority of which are perennials of about the same blue color, but white flowers are frequently found. The roots of this species are tuberous. The species are all regarded as poisonous and yield an alkaloid which in some species is used in medicine, but is extracted mostly from the seeds for this purpose. The plants often cause serious stock poisoning. The generic name is derived from the Latin, on account of the resemblance of the flower shape to the classical figures of the Dolphins.

The Indian pipe, or ghost-flower, *Monotropa uniflora,* is found during June to August in moist woods from Anticosti Island, Quebec Province, to Florida and west to Washington and California. Few other plants have such a wide distribution as this which also extends into Mexico, Japan and the Himalayas. It is the only species in this country and belongs to a small family of the same name which includes only about twelve species all growing as saprophytes on dead, or decayed, vegetable matter. Pink or red forms of this species are frequently found. The root is sometimes known as fit or convulsion-root for which purpose the root extract has been used.

The rhodora, *Rhodora canadensis,* of the Heath family, is found during May in bogs and on wet hillsides and meadows from Newfoundland to New Jersey and west to Quebec, central New York and Pennsylvania, and is the only known species of the genus. It has long been regarded as one of the rarest plants of the northeastern states and although at times large areas of it are found, they are rare and local. It is very closely related to the rhododendron and the azalea and all are placed in one genus by some botanists. Most of the rhododendrons and related forms contain a poisonous element and occasional cases of stock poisoning are reported.

"IT'S A THUNDERPUMPER," DECLARED HENRY
"No, a heron," insisted Doc. "I'll bet it's nothing but a mud hen," Dad grumbled

Now What Is That Bird?

by Lorene Squire

Photographs by the Author

"My dear," Dad said sadly, "I have protested against your surreptitious, unholy and er—bombastic hobby of bird study and Nature photography for three years. You have ruined my peace of mind. You have made my quiet, well-ordered life more like a case of hysteria. But—"

"Dad!"

"But now I, too, have to suffer with you. Doc has found some queer kind of nest in a patch of slough grass on the Chikaskia. He and Henry haven't cast a decent bass bug since. All they do is argue about what that bird is. It's probably a mud hen but they think it's a miracle."

"Oh, have you seen the nest? What do the eggs look like? And the bird—"

"I knew it. I knew it. Can't you ever keep calm when a bird is mentioned?" Dad chewed his cigar and looked very bitter. "Now I want you to tell Doc and Henry what this bird is so they'll forget it."

"But I probably won't know."

"If you don't—" Dad sighed and turned to comfort himself with his latest fishing magazine.

At seven o'clock the next morning the three fishermen madly honked the car and announced that fishing expeditions do not start at noon. Yes, they had all my photographic paraphernalia. So I jumped in the car and away we went over a Kansas road to the Chikaskia.

"I think that it's a heron's nest we have found for you," said Doc.

"No," said Henry decisively, "it's a thunderpumper."

"A thunderpumper?" I exclaimed in amazement. "I never heard of such a thing."

"It has long legs and it goes 'ur-unk'," Henry made a convulsive noise.

"A bittern you mean."

"Well, I always called it a thunderpumper."

"You never heard this bird go that way. It is, of course, a heron," said Doc.

"But you didn't see the bird at all. It's a thunder—well, a bittern."

"Neither did you see it. A heron, I say!"

"A mud hen," grumbled Dad.

And so they argued, all the ten miles to the Chikaskia.

The car chugged to a stop and there lay the river draped with willows, dreaming its easy flowing way across the prairie. We followed the banks of the stream.

There was the song of the red-wings, the rustle of the cottonwoods and Doc's and Henry's continued arguing.

"It probably isn't a heron," I told Doc, at last, to quiet him. "Herons usually like to nest in trees."

Doc gave me a pained look. Henry immediately became as a bantam rooster with a crowing complex.

The river made a turn and there in the bend was a patch of slough grass. Henry pointed out the approximate position of the nest, then began an elaborate stalk. We waited at a distance. At last he began waving his arms as a signal for us to come near. As usual he had seen a dark form slip off the nest into the grass. That was all. And there was the nest built of coarse grass with eleven exquisitely-shaded buff eggs flecked with brown and purplish-gray.

"It's a thunderpumper," beamed Henry.

"No, it isn't," I exclaimed, "I never saw a nest like that before in my life."

Henry wilted.

"Now listen. You three go just as far away from here as you can and stay. If you come near I'll—well you just have to stay away. I'm going to get a look at this bird and maybe a picture if it takes all day."

"We'll fish," sternly commanded Dad.

So they left, Doc whistling and poor Henry the very picture of dejection.

ELEVEN EXQUISITE BUFF EGGS
They were flecked with brown and with purplish-gray and in a nest of coarse grass

Out came my tripod and camera and I photographed the nest. Then I attached a string to the shutter, left the camera focused on the nest and hid in the tall grass as far away as the linen thread would allow.

I lay still against the warm moist earth. In the shadow of a nearby bluff a coyote skulked his shadowy way and was gone. A fuzzy caterpillar crawled thoughtfully across my hand. In the blue sky cavorted a pair of scissor-tailed flycatchers and ever across the prairie drifted the call of the meadow-lark. There was joy in it all—the thrill of the out-of-doors. I would capture the image of that bird on my film if it took until night. And I lay motionless while a grasshopper landed wildly on my neck.

The sun rose higher and hotter. The hours dragged on to noon and no sight nor sign of the bird. Could she have completely deserted the nest? Was she somewhere in the grass or had she flown away? My feet were numb and ants were calmly making a path up my sleeve.

Then I heard a stealthy halting rustle in the grass, different from that made by the wind. I am not sure but I think my heart stopped beating. Mosquitoes and flies chewed on me but I lay still. I could not have moved if I wanted to. The rustle came nearer. Then there was silence.

Another hour of fruitless waiting. I broiled there in the burning heat. Then again this rustle—something creeping stealthily through the weeds. The tall grass kept me from seeing the nest but I thought that the rustle had reached there and stopped so I offered a prayer and pulled the string. "Thump" went the shutter of the graflex. I stood up and a spread of brown seemed to slide off the nest and disappear in the weeds. I had photographed the mother bird at the nest.

I went to change the film and there came to my ears from close by a "bup-bup-bup-bup-kukukukrrrrrr"—like a pixy drum going ever faster and faster until it verged into the roll of the drum corps. Sometime, somewhere I had heard such a sound. But that was dimly long ago. What bird it could be I did not remember.

Would I be able to get more pictures? In the heat of my excitement I flung off my hat and let the wind tumble my most abbreviated hair cut. The burning afternoon wore on. Always I could distinguish the stealthy, halting rustle of the bird going to the nest from that of the grass waving in the breeze. And again and again I had the wondrous thrill of feeling that I had captured upon the film the furtive, elusive figure of this creature of the wild.

Four o'clock came and the lengthening shadows made further photography impossible. So I took down my camera and tripod and returned to the car feeling entirely ready to flop right down upon the sand and cockleburs from aching weariness.

The three weary fishermen were waiting for me.

"Dad," I shouted, "I got the picture. I did. I did. I did!"

"All right," he sputtered, "but don't hug me. What was your bird? A mud hen?"

"Dad—please—"

"A thunderpumper," said Henry hopefully.

"I bet it's a snipe," from Doc.

"No," I said, "I don't know what it is."

The cigar dropped from Dad's mouth. "And I sent that girl to college," he sighed.

"My child," he roared, "what is the matter with your ears?"

"My ears?"

"They're red," said Doc in sympathy.

"Fiery," from Henry.

"Your neck," said Doc, "is red."

"And your nose," said Henry, "is red."

I chuckled. I had been sunburned before. Then I looked in the mirror on the windshield of the car. What I saw made me want to faint even if I could not. It was my ears, you see, my ears. I groan to remember them. My neck was tragic and my nose was a passionate peach color that, I tell you, was not to be sneezed at, but it was as nothing in comparison to my ears.

The color of the sunset they were. Fiery is a pale, inexpressive term. And did my ears burn? They did!

When we reached home mother took one look at me and wilted into the nearest chair. Her daughter was undoubtedly not the same sweet girl. "The result of that fool hair cut," explained Dad.

Night came and my ears still glowed—poor tender things exposed for the first time to the burn of the sun. No matter if I could not sleep the family objected to my staying up and developing my pictures. Came midnight, however, and sleep with those ears was still impossible. I crept downstairs to where my developing materials lay.

A hum of conversation was coming from the library. I looked in and—would you believe it? There was Dad and Doc and Henry with every bird book in the library out on the table. Dad was reading from an encyclopaedia.

" 'The birds of the genus Grus, or the subfamily Gruinae, or the family Gruidae'—ur-ah-hem—in other words—"

"Yes?" said Doc.

Henry grumbled, "This guy Chapman says—"

"For heaven's sake! What are you three doing?"

Dad chewed his cigar and glared. "My dear," he said, "we are trying to discover what that ungodly bird of yours is."

"Did you happen by any chance to hear it go ur-unk?" asked Henry.

Doc groaned. "That's the fortieth time this evening. I don't think any normal, self-respecting bird would make such a noise."

"But it does. It goes—"

"All right. All right. Just don't repeat it."

Dad glumly bit his cigar. "Probably a mud hen."

"Please," I said, "if you folks will wait until I develop the pictures, maybe you can tell then."

So I set to work. When the negatives were finished I carried my enlarging machine and trays to the breakfast porch. The windows were up and the cool night breeze filled with the fragrance of our garden cooled my neck and nose and ever-present ears, but not my ardor. I got to work with the machine.

I held my breath from excitement. There—there I saw the nest with its gleaming buff eggs appear and next a bird with a curved bill materialize amid the tall, dark-colored grass, sitting on its nest and eggs.

THE MOTHER BIRD AT THE NEST

"Thump" went the graflex and a spread of brown glided into the surrounding weeds

And then I remembered. Long ago when I first began studying birds I had hid in a grass-grown flat along the river. And late on that amber evening a dark wedge shaped bird with short, stumpy tail had walked near me through the grass. I lay still, but suddenly he saw me and immediately was gone just as though he had melted into the grass. As he turned, I caught the black and white barring on his side and the cinnamon brown on his breast. A few minutes later I heard that call "bup—bup-bup-bupkukkrrr". Coming home, I looked him up and found that this strange mysterious bird was a king rail.

I brought the enlargements dripping with hypo to the library. Those three looked at the pictures as if they were hypnotized—they who had never before paid the slightest attention to my bird pictures, who had rather held them in contempt.

"My child," Dad said, "I'm proud of you. You have stopped this asinine argument. For my part I have not the least interest in the bird—but isn't the mud hen the closest relative of the rail? I was nearest right all the time. Now listen to this—family Rallidae, coots—same as mud hens you know—gallinules and rails—" Triumph was in Dad's voice as he read.

"My head aches," complained Henry, "I thought too much."

"I know. I know," soothed Doc. "After we rack our brains for weeks she, with this little trouble, solves our problem."

"Trouble," I exclaimed. "Consider my ears!"

Back to the breakfast porch I rushed to finish my pictures.

Upon Dad's desk there now rests the picture of that king rail—the most shy and elusive of shore birds. And whoever it is that steps into Dad's study, even on grave business affairs, must first hear the story of this wondrous bird, of how his daughter photographed it at the risk of her fatal beauty, and dire danger to her too much exposed ears.

And if you happen to wander near Dad's fishing grounds along the Chikaskia you may see him lay down his rod and reel, take out a pair of field glasses and creep along the shore looking for this shy, mysterious bird, a relative of the lowly mud hen, that bears the name of king rail, and once caused great argument.

A PANCAKE MADE FROM CAT-TAIL POLLEN
In flavor they can not be surpassed and remind one of a specially fine corn fritter

The VERSATILE CAT-TAIL

by Leslie L. Haskin

Photographs by "The Haskin Studio"

ALONG the borders of our streams and lakes the cat-tail swamps stand lonely now, and neglected. Nothing disturbs their quiet, save the silent, illusive passing of the watchful rail, the songs of the marsh wrens, the quacking and spattering of the wild ducks, or the muddying surge of the waters, where, beneath the surface, a laboring muskrat explores their depths.

Do they whisper among themselves, as the passing breezes stir their leaves, of other days when things were not as they are now? Do they wonder, and hope, and look expectantly for the return of those other, better days, when they were sought, and smiled upon, and honored?

They stretch away in narrow, straggling lines along the muddy margins of the streams, or, in the broader shallows, cover acre on acre with their serried ranks. Though forgotten now, and deserted, their royal mace is held aloft with unfaltering dignity, even as when all mankind bowed at their feet and gratefully received of their largess. From far and near, then, the Indians sought the swamps; in the east they came in fleet, light, birchbark canoes; on the western prairies they came in clumsy, awkward bull-boats, covered with the green hides of the buffalo; on the Pacific Coast their craft was the commodious, well-shaped dugout, fashioned from a single cedar log; but East or West, North or South, the cat-tail never failed them, and in it they found an abundant supply of food, fibre, medicine, or potential shelter as their need might be. The swamps resounded with life. They were not lonely then, but the centre of active industry, and for everyone, from the youngest infant, to the oldest wise and wrinkled shaman, the cat-tail had some essential product, and to all it yielded of its richness.

It is almost impossible for one not informed of the facts to realize what a large part the common cat-tail played in the culture of some of our native tribes. Probably no other American plant product, save possibly the acorns of the oak, were so widely used and valued.

First it was used as food. The roots of the cat-tail are thick, starchy rhizomes. In the autumn these roots are specially plump—full of rich stored food—and at that season they were dug and dried as a part of the winter's food supply. They were either roasted, eaten raw, or ground into a kind of coarse meal. According to competent chemists their food value is nearly equal to corn or rice. In flavor they resemble very nearly the fresh buds of the artichoke, but they are full of a tough fibre that must be removed to make them acceptable to civilized palates. This may be done by grinding or pulverizing the roots, after which, by stirring with water, the starchy nutriment may be separated very

much as starch is obtained from potatoes. After being purified it may be used as are other farinas. By adding water, salt, and pepper, a really good brown sauce may be made, or, with sweetened milk, spice and raisins, a most nutritious pudding. In the latter case the starch should be prepared with especial care, for a slightly fishy taste is sometimes present, not noticeable in gravies, but unpleasant when one finds it in a sweetened dish.

Spring is the season for the second harvest of food from the swamps. When growth commenced, and the first shoots appeared above the surface of the water, the Indians gathered them in large quantities. At this season the bases of the leaves are white, crisp, and tender, and were used somewhat as we do asparagus. Raw, these stalks have a taste somewhat resembling green watermelon rind; when cooking commences their odor is a trifle rank, but after boiling for a short time and draining off the first water, this disagreeable smell largely disappears. I have eaten them with a dressing of milk and butter and they make a very acceptable dish. Another way of preparing them is to drain the water from the cooked tender sections, after which they may be fried in butter. On such a food life could be sustained for a long time.

THE CAT-TAIL'S ROYAL MACE
They may be made into many things to grace the table and serve the home

The American Indians were not alone in their appreciation of cat-tail shoots. The Cossacks of the Don Valley consume a like dish in large quantities, and in England it is sometimes marketed under the name of "Cossack asparagus".

Later in the season, when the flower heads mature, still another food was secured. The head of the cat-tail is divided into two parts. The lower half, soft and plush-like in age, consists of the pistillate flowers. The upper half, a mere dry stick when the head is ripe, is, in the earlier stages, a compact mass of stamens. This part of the head was broken off just before the stamens matured, freed from its woody core, and cooked in a sort of flowery soup. While not as palatable as some other parts of the plant, it is still passable, and, in want of better food, would serve to stay the pangs of hunger.

The fourth, and finest food of all, and undoubtedly the strangest, was gathered from the cat-tail just when the flowers were fully matured. Did you ever hear of bread made from pollen?

"Oh, yes!" someone will say, "you mean bee-bread made from pollen, that the honey-bee feeds to its young."

Nothing of the kind. I mean real bread, made into loaves or cakes, cooked over a fire, and consumed by human beings.

When the staminate, upper portion of the cat-tail head matures the pollen is released in great masses, and it is easily shaken off and gathered. The Indians then passed through the swamps bending down the heads and gathering the pollen into cloths or mats spread in the bottom of their canoes, and from this pollen,—a fine golden flour of Nature's own manufacture,—they made large quantities of bread or mush. Two dozen good heads, if found before the wind has scattered their gold, will yield enough flour for a small cake. In practical cookery I have found it best to mix the pollen with an equal amount of wheat flour. This makes the dough more adhesive, and easier to work. Pancakes made from cat-tail pollen are specially delicious. The batter is a bright golden yellow color, and the cakes, when well browned, are rich and appetizing. In flavor they can not be surpassed, and remind one of a specially fine corn fritter. As to its nutritive value, our bee-keeper friends inform us that it is a perfect food, "Consisting of proteids, substances rich in nitrogen, sulphur, and phosphorus, and carbohydrates, or starch, oil and sugar." Save for the "bee-bread," eaten together with the immature brood of the bees by some tribes of savages, this is, so far as I know, the only recorded use of pollen for human food.

The leaves of the cat-tail do not at first suggest a textile fibre. Green, they have very little tenacity, and break easily, yet as many of us remember, our grandmothers braided them into door-mats, and our grandfathers wove them into chair-seats. Likewise, the Indians found for them a multitude of useful applications. Rightly cured they become quite tough, and capable of resisting considerable wear. During July and August, when their fibre had attained its fullest strength, and yet retained, to a large extent, its pliable qualities, these leaves were gathered, and dried in the shade, for winter use. As a thatch for summer huts their use was almost universal throughout the Pacific Coast states. Next to this, their simplest application to use was probably the making of ropes and strings for temporary tying. A load of fagots, or a bundle of paddles to be tied, a boat to be moored, or a sack to be mended, and it took but a moment to twist together a cat-tail cord, and its convenience was everywhere recognized.

Cat-tail mats of never-ending form next demand our attention; mats for seats, for cushions, and for beds; mats for house-linings, house-hangings, and partitions;

THE CAT-TAILS STAND NEGLECTED

They no longer enjoy the favor they had in earlier days as food and fibre

mats to kneel upon in the canoe while paddling; folded mats for carrying purposes; mats to cover food while steaming, for serving food, for table-covers, for pillows and for sails, and mats for shelters of every sort, from a mere cape to crouch under during a storm, to a complete house, wherein a whole family might spend the summer.

An outgrowth of the mat for carrying purposes, first by simply folding and sewing, and later by weaving and shaping, the cat-tail became the fabricating material for pouches, sacks, quivers, cradles, hats, and baskets.

During the cold winter days, and dark winter evenings, as the old women twisted and wove the leaves of the cat-tail into mats and baskets, they also related the myths and tales of their people to a circle of wide-eyed, listening children, for only thus was the history of the tribe carried on from generation to generation. It is not to be wondered at, then, that into some of these tales should finally be woven some wonderful stories of the cat-tail—of magical arrows made from its heads, wherein a man or woman might be hidden, and shot through the air for great distances; and of equally wonderful canoes, made from a single split stalk, and which, when shaken, became a full-sized boat, able to carry its maker safely over the roughest waters in his travels.

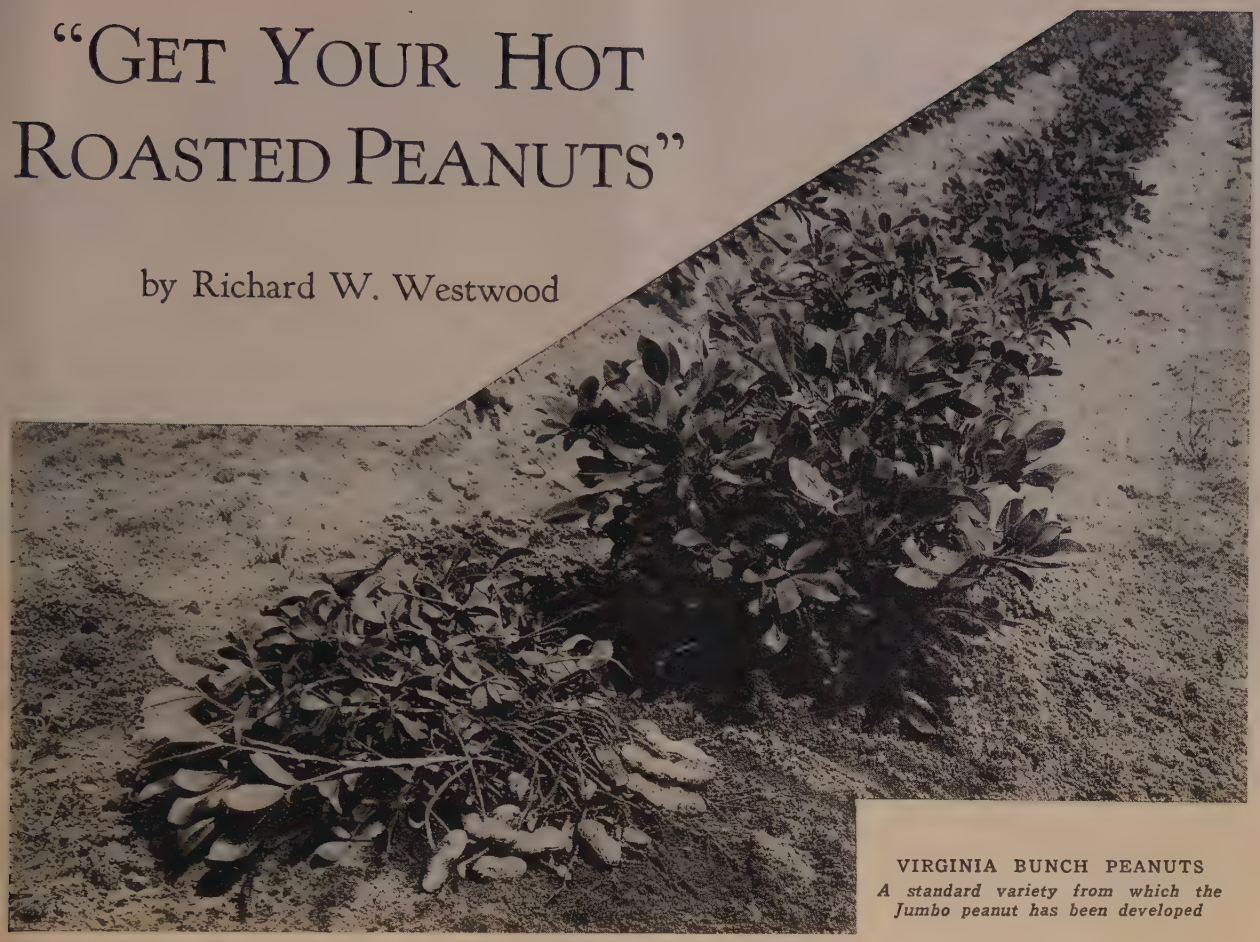
HOWARD FOWLER

TABBY MOTHERS TWO HOMELESS SQUIRRELS

When the axe destroyed their tree home the babies took a foster mother who added them to her brood of five

"Get Your Hot Roasted Peanuts"

by Richard W. Westwood

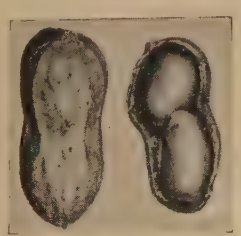


VIRGINIA BUNCH PEANUTS
A standard variety from which the Jumbo peanut has been developed

Just as shrill as in yesteryear is the copper sidewalk roaster that proclaims the thorough cooking of the toothsome peanut. Just as important,—if not as large,—is the paper bag with twisted ends raucously advertised and deftly tossed in and about grandstand and bleachers. Stripped of their crackling pods, salted and encased in glazed envelopes, peanuts annually bring down a veritable hailstorm of nickels. Crushed into a tasty butter, they make many a sandwich and encrust many a cracker. The lowly peanut is an American institution,—adopted and adapted, but, nevertheless, ours.

Like many of Nature's economic gifts, the peanut had its origin in foreign lands before our people took it to their palates. China and Senegal, India and the East Indies, grow enormous quantities of peanuts, transforming them into oils and other products. It was left for the United States, however, to make the peanut a hand-to-mouth proposition. Although an early colonist, the peanut vine did not really become a prominent citizen in a commercial way until 1870. It has developed for itself an industry in the last three decades of the century, and in recent years has approached the one hundred million dollar mark as a crop.

Let us consider the peanut intimately. The botanist will point out to you that it is not a nut at all, but a pea, a relative of the pea and bean of your garden. In fact, it is sometimes known as the "ground pea" or the "goober pea". On the other hand, many are inclined to insist that it looks like a nut, cracks like a nut and tastes like a nut; therefore, it should be a nut. So the very name peanut is a compromise that should satisfy both scientist and baseball fan.



SEED PEANUTS
Good grade selected for planting

A cosmopolitan is this fellow with the wrinkled shell. Give it three to five months without frost, liberal sunshine, a fairly high temperature, moderate rainfall and a loose, sandy loam soil and it will make itself at home in its own peculiar way. Peculiar it is, because, unlike its pea and bean relatives, it chooses to grow up under ground, although it does consent to blossom above the surface.

Our best peanuts come from the best families; the vigorous plants of proved ability. From such are the seed peanuts chosen, and those marked for the task of carrying on the succession are left in the earth to become fully mature. Some bright day that assures good curing, they are carefully dug and cleaned by hand. Injury to the thin red covering that coats the kernel is fatal at this time. When the soil is well warmed by the sunshine of April and early May, the seed peanuts are sowed. Planting varies with localities but usually the seed are set out from seven to eighteen inches apart in rows with three feet between. Salamanders, moles and some rodents fancy the peanut and often it is necessary to dissuade these appetites by sprinkling the seeds with a solution of pine tar and turpentine.

Soon the peanut vine makes its appearance and begins its busy life; busy because little bacteria are actively gathering free nitrogen to store in the root nodules. At the joints of

THE OLD-FASHIONED WAY OF PICKING

In former years peanuts were taken from the vines in this slow and laborious way

stem and leaves appear the small, yellow flowers, which, once pollinized, fade. In their place, below the surface, the part of the plant known as the "peg" gropes into the soil to make way for the subterranean development of the pod. The roots do not spread widely, an advantage at harvesting time because they can be left in the soil and help retain its fertility.

So, in its quiet retiring way, the pod with its kernels develops. Watching his crop, the peanut grower may notice a slight yellowing of the foliage of his vines. Examining the pods, he will discover that the peas are full-grown and there are darkened veins on the inside of the shells. This means harvest-time and delay is likely to reduce the crop. Armed with a mechanical potato digger or similar instrument, the harvester starts his work, cutting the pod-bearing shoots away from the root system and lifting the rest out to wilt in the sun for an hour or two.

One of the most picturesque features of harvest-time in the peanut fields are the stacks built up for curing-time. The peanuts, still attached to the wilted vines, are piled about poles to which crosspieces have been nailed a few inches from the ground. Often these stacks dot the field like haystacks, although if there are hungry hogs about, the vines may be taken to a central point and cured within the protection of a fence. The stacks are built with the peanuts inside next the pole, and the vines highest near the center to shed the water. For six weeks the commercial crop is thus cured for picking-time.

PEANUT FLOWER AND PEGS

The small yellow bloom appears at the joint where the leaves are attached to the stem

Once the vines are dry and brittle the pods can be taken off. Formerly, this task was hand work, but as the industry has grown, machines have taken over this work. The stacks are picked up as a whole from the fields, carried to the picking machines, which separate pod from vine and, usually, drop the peanuts into bags. If the product is to be graded this is done during a recleaning process that discards the light pods and trash that may have escaped in the mechanical picker.

Most of us know peanuts as something that one

PICKING THE PEANUTS OF TODAY

This machine, like the old-time thresher, is used for rapid picking of the peanuts

seems to have to eat until they are all gone. But they mean even more to the boll-weevil beset farmer of the South and Southwest. Routed in battle against the weevil the farmer faces failure and fallow fields. But the peanut offers him a helping hand. The Department of Agriculture says that this modest fellow will serve as a money-producing crop to rotate with cotton in areas infested with the costly weevil. For a long time the peanuts raised in the region of the Gulf were used largely for the feeding of stock, but with the apparently ever increasing demand for peanuts, a dozen states now boast a peanut crop of commercial importance.

With his good peanuts going to the market to be squashed, salted, paper-bagged or otherwise made into something toothsome, the farmer still has the vines for stock feed and the inferior pods to delight the appetites of his hogs. These pods can also be ground, shells and all, into material that is mixed with other ingredients for dairy and poultry feed. Thus, the peanut is an efficient crop as well as a profitable and popular one, and helpful in hard times.

Beside its more common retail uses, the peanut possesses and has possessed for many years, values that make it a large factor in world commerce. In Marseilles, France, the peanut market is a busy center because the French have long manufactured peanut oil much prized for the packing of sardines. In its higher grades it makes good salad oil and the better quality of peanut meal left after the oil is extracted is used for human food, the poorer grades going to feed stock.

STACKING UP THE PEANUTS

In harvesting, the vines are built up into stacks, sloping to shed water

For eating roasted, as we do in the United States, foreign appetites appear to have to be educated. It is said, however, that recently peanuts were sold on London street corners, bought and eaten with relish. Curiously enough they were not roasted at all.

So in the burrowing peanut, Nature has given a great gift to the world and to prosperity. America has made it its own as a companion to baseball, ice cream sodas and other things that are, as they say, "typically American".

LARVA, CHRYSALIS AND IMAGO OF THE SWALLOW-TAIL

JUST "BUGS"

by Ernst Keil

Photographs by Ottillie Keil and The Author

THERE is a powerful sermon in the lashing fury of a thunderstorm, but there is one just as powerful in the life-cycle of a butterfly. The hand that guides the heavenly bodies in their silent orbits reveals as much loving care in guiding the short life of a tiny insect.

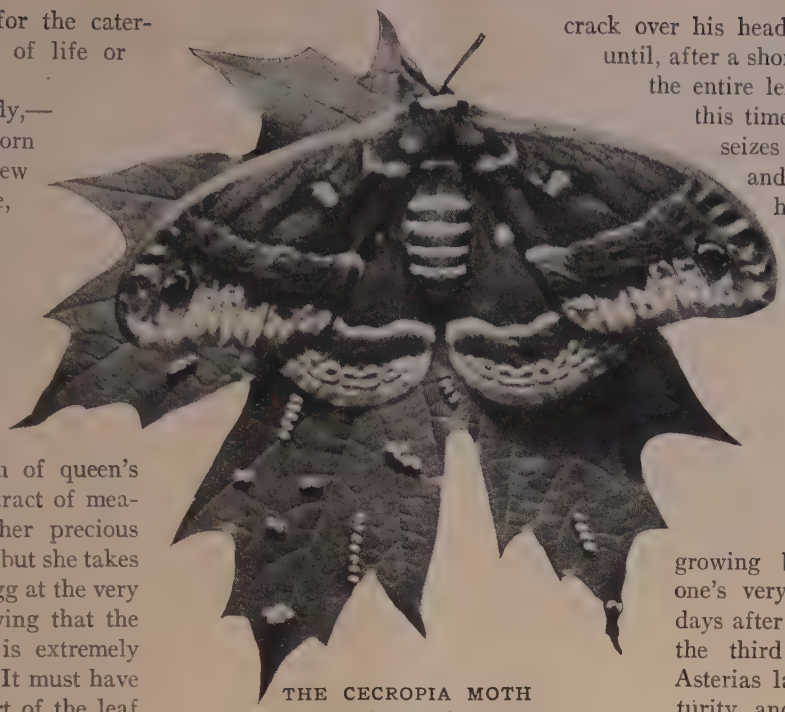
In the world of insects every vital act of each and every member is prompted by an impulse so all-compelling that the individual finds it apparently impossible to suppress it or change its course. Although none of these queer insect-citizens are capable of reasoning in the human sense, their universe functions with the smoothness and precision of a chronometer.

Did you ever rest in the friendly shade of a tree at the edge of a farmer's meadow? If you did, no doubt you have watched and admired the handsome swallow-tail butterflies, their shapely wings a velvety-black marked with bright yellow, as they leisurely idled among the wild flowers and gracefully swaying heads of queen's lace. Entomologists have labeled this pretty swallow-tail, *Papilio asterias*. While the males quest love and nectar among the myriads of flowers, the females are bent on duty stern. To perpetuate the species is their sacred mission and they must hurry, for their span of life is short,—one week, two or three at the most. With their mental equipment fully developed at birth and their physical growth completed two hours later, they are ready for their life's work.

The larva of Asterias lives on the foliage of plants like parsnips, parsley and queen's lace. No matter how ravenously hungry such a caterpillar may be, and no matter how tempting some other plant may look and smell, he will accept no substitute. For his well-being then, it is absolutely necessary that his mother, the female butterfly, shall be acquainted with his needs. More than that, her botanical knowledge must be such that she can—unerringly—distinguish umbelliferous plants from the thousands of others which she encounters in

her flights. This, for the caterpillar, is a matter of life or death.

Here is a butterfly,—a mere insect,—born perhaps just a few short hours before, who has never seen a plant of any kind. Yet with uncanny, unfailing accuracy, as if guided by an unseen hand, this speck of animate matter will single out a solitary bush of queen's lace on a ten acre tract of meadow and deposit her precious eggs. Not only that, but she takes care to place each egg at the very tip of a leaf, knowing that the larva at its birth is extremely small and delicate. It must have the most tender part of the leaf to nibble on as soon as it emerges from the egg. Never once does she makes a mistake in the selection of such a spot.



THE CECROPIA MOTH
The female busy laying her eggs on a maple leaf

Anywhere from a few days to two weeks after our lady has carefully laid her egg, the tiny caterpillar, imprisoned within its walls, has developed to a point where his cradle can no longer accommodate him. With his sharp mandibles he resolutely gnaws a hole through his prison's wall and through it a ridiculously small worm struggles towards the light. No fond parents protect and teach him; his instinct-regulated mind is his only weapon. At this moment he is so small and delicate that a gentle gust of wind might blow him to certain destruction and a single drop of rain would suffice to drown him.

ON EXPLORATION
Larva of Monarch butterfly on the milkweed

With the confidence and knowledge of an expert he adjusts the suction cups of his eight feet and the anal prolegs on the green leaf, securing a hold that nothing but actual force can sever. Without wasting one precious moment he begins his life's first important work—eating. After several days, about equally divided between eating and resting, he finds that his "birthday—clothes" begin to fit him rather "quick". He feels as uncomfortable as most little boys do after an oldfashioned Thanksgiving dinner. Lazy and sluggish he settles down for a rest. With a few threads of silk, skilfully produced from his spinneret, he fastens himself to the stalk and waits. After a day or so his skin shows a crack over his head and along the neck until, after a short time, it extends over the entire length of his body. At this time a desire for activity seizes the creature once more and deftly he wriggles himself out of his swaddling - clothes, thus completing his first moult.

With the acquisition of a new and comfortable garment his normal appetite returns and with renewed vigor he takes up his routine of eating and resting, growing bigger almost under one's very eye. Three or four days after shedding his skin for the third and last time the Asterias larva has reached maturity and is about ready to complete his life's work.

Swathed in a robe of the richest satin-green, his chubby body encircled with a series of jetblack rings, the latter adorned with bright yellow dots, the creature is an object of exquisite beauty so far as coloration is concerned. Now only his last act, the transformation from caterpillar to chrysalis, remains.

On having attained his full growth the larva stops eating. For several days it wanders about in a restless sort of way like one who requires a little time to steady his nerves before carrying to its conclusion a duty that is unpleasant but can not be shirked. The Asterias caterpillar has reached the end of his earthly trail. Having selected a suitable place he prepares for his last sleep among the gently nodding heads of queen's lace and wild flowers. With great care he deposits a small cushion of silk on the selected stalk and while the silk is still soft and sticky he deliberately presses his anal prolegs upon the cushion and patiently waits for it to dry. Next he throws a single thread, girdle-like, around the middle of his body and fastens the ends to the stalk. Having himself thus securely anchored, his feet relinquish their hold and he bows his head in silent acquiescence to Nature's law.

GOING TO SLEEP
Larva of swallow-tail naps 'mid queen's lace

ONE OF THE SWALLOW-TAILS

By this time the first changes in shape are noticeable. The body is gradually shrinking until it is only about two-thirds of the original size. At the same time a consider-

JUST OUT OF THE COCOON
Male of Callosamia promethea, a native spinner of silk

able tapering toward the lower part takes place. Then the slowly changing larva takes a breathing spell as if to gather courage and strength for the final struggle. Presently the labors are resumed, and nobody who has ever witnessed this last act in the transformation can escape the feeling that it requires an enormous effort. Beginning with hardly noticeable shivers the labors of the insect increase until the body of the creature is racked by terrific convulsions. All during this time the body of the caterpillar undergoes an ever so gradual change in shape as well as color until, after six or eight hours, we behold the insect in its new form—the chrysalis. Of the caterpillar that was, nothing is left to remind us of his existence but the shred of dried skin, dangling melancholy from the lower end of the lightgreen colored chrysalis.

For about three weeks the chrysalis leads a quiet existence, swayed and caressed by kindly zephyrs. But within its parchment sheath secret forces are at work day and night to fashion one of nature's marvels. At the appointed hour the chrysalis bursts open and from its snug envelope emerges an ethereal creature—a lovely swallow-tail. At first it seems all body, the wings are just short stubs. But under the pressure of the tiny heart life begins to pulsate through its delicate body, and the wings, like velvet drapes, slowly unfold their beauty. Hardly anything in the whole range of insect life is more interesting than the magic-like development of the butterfly after its escape from the chrysalis. In two short hours she is mature, eager to sail forth a companion of the sunshine and the breezes.

One would hardly think that such lovely and harmless creatures have enemies, but they are no exception to the old earthly rule, "eat and be eaten". Birds take their daily toll. As a protection butterflies have their wings and they, as a rule, serve quite well. However, Nature is versatile and she takes a keen delight in experimenting. The methods she employs are always exceedingly interesting.

The Monarch or Milkweed butterfly, for instance, enjoys a peculiar protection. The caterpillar subsists on the leaves of milkweed. The juices of this plant are severely penetrating and impart a singular flavor to the tissues of the insect. This flavor is so persistent that it permeates not only the caterpillar, but the chrysalis and imago as well. This milkweed flavor is very distasteful to birds and consequently the insect in all its stages is immune against their attacks. Birds very rarely make mistakes in this respect, but "near-mistakes" occur now and then. Once I watched a Monarch floating complaisantly along the edge of an orange grove in Southern California. Suddenly a bird, not much larger than the butterfly, dashed out of one of the trees with fell intent. But when about to attack the insect the bird evidently sensed his mistake, circled the butterfly respectfully and returned to his roost in the tree. My chuckles had hardly subsided when a Colias came hustling over the same route. Out shot the same bird again and this time quickly ended the career of the pretty little sulphur colored butterfly.

THE LOVELY LUNA MOTH
This one of our silk spinners rests on a wild grape

However, the protection of butterflies is not all, the larvae must be taken care of also. The caterpillar, when attacked, usually throws his body violently from side to side and in some cases emits a brown liquid from his mouth. These are, of course, purely defensive measures and are no doubt intended to frighten and discourage the attacker. This behavior under attack is characteristic of all caterpillars, but among them are quite a number who enjoy in addition a special protection. To this "privileged class" belong the larvae of all the swallow-tail butterflies. They are equipped with a means of defense that no other butterfly larvae can boast of. When attacked they quickly throw their heads back and unsheath with a rapid move a pair of slender horns, yellow or red in color. These horns are projected through an opening in the skin back of the head and spread a powerful odor which, to human nostrils, smells like over-ripe pineapple. Here we have an ideal weapon of defense.

All our birds, but especially the insectivorous ones, rate the sleek caterpillar very high on their "diet-sheet" and they hunt them with zest and determination. But Nature has a way of keeping things nicely balanced in her domain. As she elected to give birds greater intelligence coupled with great physical advantages, she evened up matters by making the caterpillars more prolific and by giving them a greater measure of natural protection. The latter, with few exceptions, live on some kind of living vegetation, such as the foliage of trees and bushes. As the leaves of most trees and bushes are green in color, Nature has adopted green as the predominating color for her countless hosts of larvae. If we add to this protective coloration their endless variety in form, which in many cases is just an additional protection, we can not help but feel that the crawling legions have at least a fair chance against the tribe of birds.

AND HERE IS THE MONARCH
Of Scottish royalty, perhaps, for witness the thistle on which it perches

THE GIANT SWALLOW-TAIL
It sips the nectar from the tasty red clover

Among the armies of insects who awaken when the last rays of the sun caress the day to sleep are the butterflies' nearest kin, the moths. The life-cycle of the latter is essentially the same as that of butterflies, even their anatomical characteristics are analogous. However, there is one very marked difference, and that is the structure of their eyes. While the eyes of most butterflies function best in daylight, the eyes of the vast majority of moths are adapted for use in the dark. Their noonday is our midnight and their evening is our dawn.

There are tens of thousands of moths which have gorgeously colored wings, but do not display their brilliant charms until after dark when they take the air. Under light conditions that would force any human being to grope his way with the greatest caution, these denizens of another world move with the swiftness and ease of a humming-bird. Are they guided by the last shreds of luminosity vibrating within the inky folds of night, or have their faceted eyes the power to respond to other forms of radiant, tremulous energy of which we, the crown of all creations, are unaware?

Of the many families of moths who make the summer night gay and vibrant with life and motion, the great family of Hawkmoths is a most interesting one. When

evening approaches stand by a bed of petunias and watch them come. With the speed of meteors they drop out of no-where. While the day still lingers in the dreamy twilight of dusk these impatient denizens of the dark sail forth to frolic. Humming-bird-fashion, they feed while on the wing. Hovering in front of a flower they unroll their long suction tongue and with it they probe into the sweet smelling depths to sip a few drops of nectar. And off they are again, swallowed up by the darkness.

The Hawkmoths, or *Sphingidae,* as entomologists call them, are insects with powerful bodies and long, slender wings. When the latter are expanded they call to mind the structure of airplane wings. These insects are capable of rapid and sustained flight as might be expected from their peculiar build. Hawkmoths are great gourmands and Nature, quite accommodatingly, has provided them with tongues of two suction tubes of enormous length. They are often several times as long as the body of the insect. Nature has made this organ of a material that is not only very durable, but very flexible as well. When not used for feeding this tongue is rolled up in a tight little spiral and snugly tucked away under the moth's chin, as it were.

The larvae of most species of this group are as a rule large and their color is most often some shade of green. The body is adorned with an anal horn, a characteristic feature of this family. When at rest this caterpillar assumes a most peculiar pose: the anterior segments are drawn back, with the front part of the body held aloft.

In striking contrast to the family of Hawkmoths, which are good flyers and hearty feeders, there is the small group of moths known as our native silk spinners. For the most part these moths do not partake of nourishment while spending their appointed days in the imago stage. *Callosamia promethea* and *Samia cecropia* are two eminent members of this most interesting group. It seems they had at one time in the dim long-ago the facilities to enjoy a honey-feast, for a close examination reveals rudimentary mouthparts. Chances are their ancestors neglected to take nourishment, which became a fixed habit. Their living days are, of course, short and what they need to sustain life is contained in their large bodies. As they have no means to re-stock their furnace of life with fresh fuel, they perish as soon as the original supply is exhausted, which is usually after a few days. The color patterns of their wings are handsome and artistic and the insects are among the largest found within the faunal regions of the United States. Specimens of *Samia cecropia* measuring from six to nearly eight inches across their wings are not at all uncommon.

These insects are called silk spinners because the larva is equipped with an organ to produce that glittering fabric known as silk. Although the grade of silk produced by the caterpillar does not come up to the product of the silkworm of the Orient, as a weaver it must be considered a master par excellence. When ready to go in pupation the caterpillar prepares for himself a shining cradle, better known as cocoon, which is one of the marvels of artistic silkweaving and has no peer in the whole realm of Nature. He begins his work by securing anchorage on the twig of a tree. With endless patience he spins a roomy bag with himself in the center of it. This bag constitutes the outer shell of his winter home and in order to make it waterproof, he impregnates it with a chalky fluid which dries very quickly and transforms the bag into a tough, parchment-like cover. This cover the larva lines with a fluffy mass of fine, loose silk. Within this first cover he spins a tightly-woven smaller bag. The inner wall of this, his last resting-place, he again impregnates with the same chalky fluid he used to waterproof the outer envelope of his cocoon with. Inside this last bag the transformation from caterpillar to pupa takes place.

As insects were among the early manifestations of animal life on our planet, it is quite possible that "bugs" shall be the only witnesses in the last chapter of life on this globe. W. J. Holland has pictured a very interesting and probable version, when he writes:

"When the moon shall have faded out of the sky, and the sun shall shine a dull cherry red at noon day, and the seas shall be frozen over, and the ice-cap shall have crept downward to the equator from either pole, and no keels shall cut the waters, nor wheels turn in mills, when all cities shall have long been dead and crumbled into dust, and all life shall be on the very last verge of extinction on this globe: then, on a bit of lichen, growing on the bald rocks beside the eternal snows of Panama, shall be seated a tiny insect, preening its antennae in the glow of the worn-out sun, representing the sole survival of animal life on this our earth—a melancholy 'bug'."

A MOLE PHOTOGRAPHED IN DEFENSIVE POSE CORNELIA CLARKE

HINTS AND HELPS

FOR

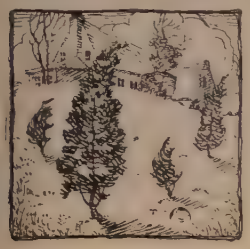
HOME and GARDEN

SEPTEMBER

For winter bouquets nothing can be prettier than to dry various grasses and weeds to mix with everlasting flowers. They should be hung upside down until well dried out. To make them more colorful they may be gilded or dipped in a weak solution of alum water to give them a frosty appearance.

* * *

Every tiny chrysanthemum bud will come out in the house. This is one reason why chrysanthemums make such a successful flower for home decoration. If large individual blossoms are desired, nip off the smaller side buds and leave only one large bud to each branch. For the best results, both chrysanthemums and dahlias should be given extra nourishment in their blooming season. Liquid manure applied every two weeks is one of the best foods.



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The newly planted evergreens must be given plenty of water. A great deal of winter killing is due to the ground's freezing after a dry spell in the fall, so that the tree has to go through the winter without any reserve of moisture.

* * *

Before the frosts come it is a very good idea to dig up a clump of parsley, pot it, and bring it into the house. If kept in a sunny window, it will live well into the winter. The same treatment can be applied to nasturtiums, which supply bright and unusual colors during the short winter days.

* * *

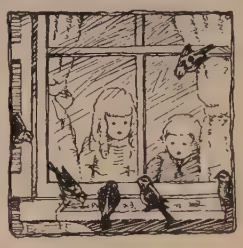
After repotting any plant it is well to strike the bottom of the pot against the floor, in order to firm the soil. In potting plants to be brought into the house from the garden, cut off a few leaves and branches to offset any injury which may have been done to the roots.

* * *

It is high time to hang suet in your trees so that the woodpeckers, chickadees, and so forth will become accustomed to paying daily visits to your garden. By starting a feed tray, attached on the outside of the living room window sill, you may induce song sparrows and many other birds to decide to winter with you instead of migrating southward.

Heavily laden limbs of apple trees should be well propped up by poles or guyed up by wires to prevent breakage. If wires are used, it is well to pad them, lest they cut into the limbs. The loss of even one main branch is serious to the owner of a small home garden.

Watch the peach trees for signs of the peach borer. He works near the ground level, and his presence is made known by the gum which exudes from the hole in which he is buried. Dig him out of his burrow with a knife or a stiff wire. If there are several peach trees, it is often easier to sprinkle a little paradichlorobenzine in a ring around the trunks, about an inch away from them, and then heap up some dirt over it. The crystals will form a gas to kill the borer.



In a small garden the fallen fruit should always be destroyed, as there are several kinds of harmful insects which develop in the decaying fruit.

* * *

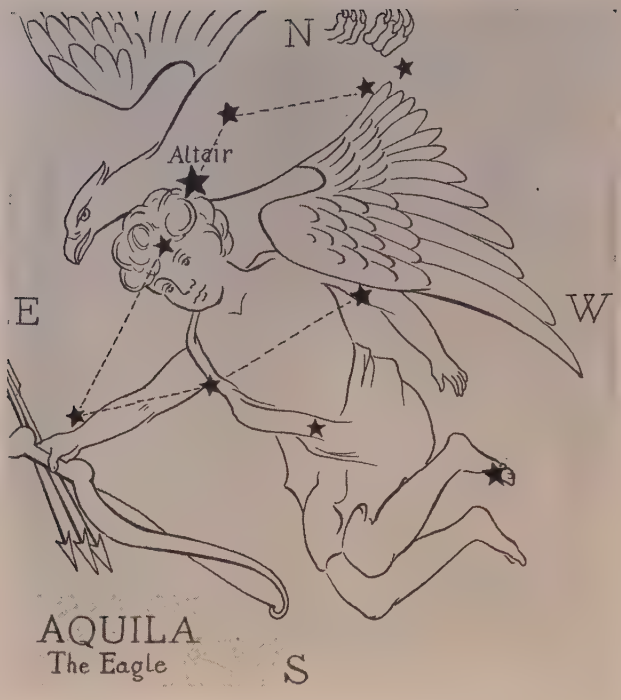
Now is the time to overhaul the perennial bed and divide any clumps that are over-crowded. New peony plants may now be set out and old plants divided if they are crowded, but do not touch them unless it is absolutely necessary. Peonies do better if left undisturbed.

In the northern states the ferns and tender house plants, which have been spending the summer in the garden, should be brought into the house before there is danger of even a light frost. They should become accustomed to the house before any artificial heating is started.

A good suggestion which has been offered is to water the pots with lime water before bringing them into the house, in order to drive out any earthworms which may be in the soil.

Roses will be encouraged to produce more fine blooms in the fall if some nitrate of soda is put on them. A great many nurserymen advise fall planting for new roses rather than spring planting.

Freesias must be potted now in shallow pans. They take at least sixteen weeks to bloom. They are among the few bulbs which do not require to be set in a dark place for the roots to form, as the roots and tops grow at once. Plant madonna lilies four inches deep.



OUR CONSTELLATION FOR SEPTEMBER
The eagle is shown bearing the youth, Ganymede, in its talons

The EAGLE in SEPTEMBER'S SKIES

by Isabel M. Lewis

DUE SOUTH this month in the early evening we will find the constellation of Aquila, The Eagle, with its beautiful Altair, a white star of first magnitude, less beautiful than Vega which lies not so far away to the northwest, but yet one of the finest stars visible at this time of year. Altair signifies "Flying Eagle" and the constellation of Aquila, we are told, represents the bird of Jupiter which carried his thunderbolts and which was sent by Jupiter to seize the youth, Ganymede, whom he desired to have for a cup-bearer. The eagle is shown bearing the beautiful youth aloft in his talons.

Altair is one of our close stellar neighbors for it is only about sixteen light years distant, that is, a little less than one hundred trillion miles. Only three of the twenty brightest stars in the sky, Alpha Centauri and the two Dog Stars, Sirius and Procyon, are nearer to us than Altair.

Vega, it may be recalled, is attended by two faint stars that form a little equilateral triangle with it. Altair, also, is escorted by two fainter stars, but in this case the bright star, Altair, lies in line with and midway between the fainter stars.

Two little asterisms lie not far distant from Aquila. One of these is Delphinus, The Dolphin, which carried Arion, the famous musician, to shore with his harp, Lyra, when he had that unfortunate experience with the sailors who coveted his musical prize. Delphinus is also known by its popular name of Job's Coffin. It is the little diamond-shaped group to the northeast of Altair. The other little group is known as Sagitta, The Arrow. We are not told whether this stray arrow fell from the quiver of arrows born by Ganymede when the eagle carried him away, or whether it was dropped in the path of the Milky Way by that famous hero, Hercules, who will be found not far distant. Sagitta is outlined by four stars of third and fourth magnitude, three of which lie in a straight line while the fourth lies below and close to the most westerly of the other three. The group will be found only a few degrees due north of Altair.

Aquila, as well as Cygnus to the north of it, lies in the path of the Milky Way which divides into two branches in Cygnus. One of these flows through Sagitta and Aquila, the other through Serpens and Ophiuchus. These two branches exist for nearly one-third of the entire length of the Milky Way and extend diagonally across the September evening sky from Cygnus, now overhead, to the southwestern horizon where they meet in Scorpio.

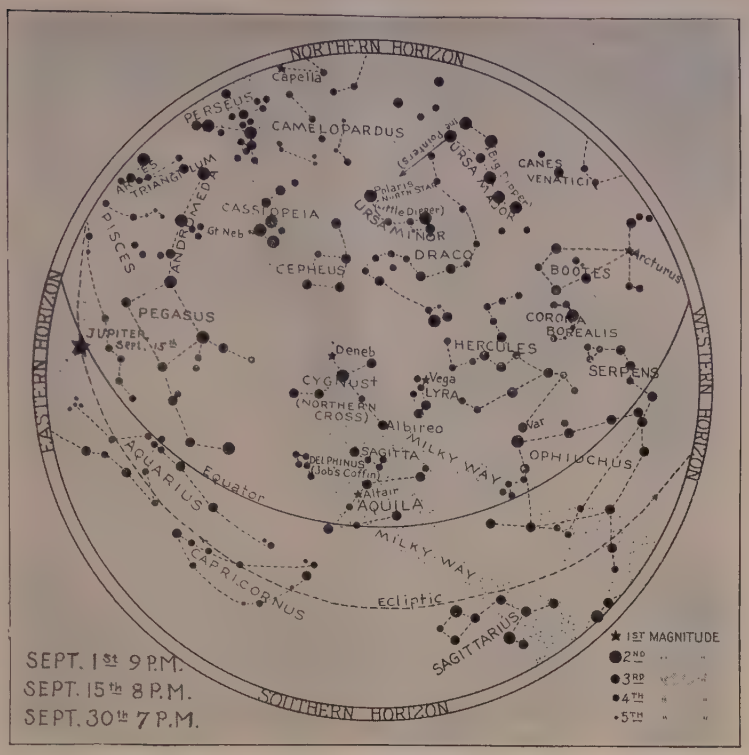
The huge, straggling constellation of Ophiuchus, The Serpent-Bearer, is one that many find very difficult to locate. This is not strange for it has no distinctive shape and contains but one star brighter than the third magnitude. This star is Alpha Ophiuchi, which is of the second magnitude and lies directly south of Hercules and close to the reddish, variable star Alpha Herculis. These two stars mark, respectively, the heads of Ophiuchus and the hero, Hercules.

Ophiuchus represents the famous physician, Aesculapius, who was so successful that Pluto, god of the lower world, feared his kingdom might become depopulated and so persuaded Jupiter to hurl a thunderbolt at him. He is represented with the inevitable serpent that was associated with the medicine men of the early ages. So intertwined are the two constellations of Ophiuchus and Serpens that is not an easy matter to disentangle the two groups. The head of Serpens is marked by a small group of stars directly below Corona Borealis, The Northern Crown, while the tip of the tail will be found bordering on Aquila. In the enormous area between and now in the southwestern sky in the early evening lies the huge form of Ophiuchus, vague and indistinct. One branch of the Milky Way passes through

the eastern portion of Ophiuchus and Serpens while the western half of Ophiuchus lies directly below Hercules and north of Scorpio.

Sagittarius is particularly conspicuous in the far southern sky this month and high in the east appears the Great Square of Pegasus, followed by Andromeda, to the northeast. The beautiful Arcturus in Boötes will soon set in the northwest, a sign that fall is approaching.

The magnificent planet, Venus, that has been in the western sky for months has now disappeared from view. Early in September it is still in the western evening sky but too close to the sun to be seen. On September 10 it comes into inferior conjunction with the sun when its phase, viewed from the earth, is the same as that of the new moon. After that Venus passes to the eastern morning sky and will easily be visible before sunrise before the end of the month as it draws rapidly away from the sun. Mars is still in the western evening sky in Virgo but is so close to the sun and so faint that it can scarcely be seen in the twilight.



MAP OF THE SEPTEMBER SKIES
To use hold over the head with the top toward the North

On the twenty-third of September the sun crosses the equator in the constellation of Virgo, going south and autumn then begins at 8:17 P. M. Eastern Standard Time.

Saturn is still well in view in Scorpio in the southwestern sky early in the evening. It will be found a few degrees northwest of Antares. Jupiter is now the finest planetary object in the evening sky. It is in the constellation of Pisces close to the position of the vernal equinox, or the point where the ecliptic crosses the celestial equator. On September 22 Jupiter will be in opposition to the sun and then will be visible throughout the night. Mercury will not, however, be visible during the month of September.

THE DEVIL'S TONGUE

by Louise Ravens

DEAD RATS, INDEED!
The odor was merely that from the flower from Cochin China, known as devil's tongue

"GOOD MORNING," said my friend the Botanist. "Good morning," said I.

"Would you like to smell my lemon tree in bloom?"

"I would," said I. So he led me down a winding stair, into the little glass house which he laughingly calls his conservatory.

On the way he explained that he would have to apologize for the vile smell among his plants, an odor which almost completely overpowered the fine fragrance of the lemon tree. He was sure there must be a dead rat in the wall. He had hunted everywhere in vain.

Said I, thinking of certain flowers which I bring in from the woods, "Perhaps you have a carrion flower somewhere about!" And now my friend the Botanist slapped his thigh and exclaimed, "By Jove, it's that devil's tongue, and I never thought of it. Last year it played me the same trick." And the devil's tongue it was, *Amorphophallus rivieri,* a tropical plant which the Botanist had imported because of its oddity. There it stood at one end of the greenhouse, pouring out a something too vile to be classified as a scent. Dead rats, indeed! The cause was quite plain when one stopped to think,—and smell.

In shape the flower or spathe of *rivieri* is very much like our calla lily, but considerably larger and brownish. The scape, or stem, of the flower is dark, speckled with light red. This gives it a snake-like appearance and accounts for "snake-palm", one of the common names of the plant. The rank odor probably emanates from the base of the strangely ribbed, purplish "tongue" or spadix, for it is here that we find the true flower elements. As in the case of the carrion flower, *Smilax herbacea,* the odor is strongest at the time when fertilization is most likely of accomplishment, this being Nature's way of attracting the carrion-loving insects which are needed for pollination.

In the North the devil's tongue is usually propagated from tubers, though it grows from seed in its native habitat. The leaves of the plant do not begin to grow until after the flowering season, the weird spathe with its unattractive odor being first to appear in the Spring.

Six Little Pharmacists

by Marjorie Shanafelt

NOW YOU SEE IT
Nest of baby cottontails uncovered

NOW YOU DON'T
Mother cottontail carefully covers her nest

WYMAN R. GREEN

Spat, spat! sounded Mother Rabbit's feet on the dusty road. Spat, spat! they sounded on the gravel drive. Then it was very quiet because Mother Rabbit wasn't running any more but was sitting up very straight in the center of a big, grassy triangle. Mother Rabbit wriggled her pink nose. Then she pulled her right ear down over her face and washed it very carefully. Mother Rabbit always washed her right ear when she thought. She was thinking hard now for she was wondering if this grassy spot wouldn't be a fine home for her six baby cottontails.

The moon shone down upon the tall brick buildings that owned the grassy patch on which Mother Rabbit sat. The buildings looked very wise for they were university buildings. All day long the rooms were filled with people, some very young, some quite old. They studied in fat books and worked with odd-shaped bottles and strange instruments. They studied so hard they had wrinkles on their foreheads. Now, it was night. Everybody had gone home. The windowed walls had nothing to look down upon but the grassy patch. Along three sides grew bushes and flowers in little clumps and patches. On one side Mother Rabbit saw a gap in the clumps. It was really an arched trellis leading into a garden. In the garden grew mint, rhubarb, jimson, catnip, and many, many other good-smelling plants. The people with wrinkled foreheads called them herbs. They were learning to make the herbs into medicines to make sick boys and girls well and happy. Mother Rabbit's nose twitched up and down, and then it twitched from side to side. Here was just the place for Baby Rabbits to come to school.

So Mother Rabbit dug a little hollow about as large as the hollow of one's hands. Into this she tucked her six baby rabbits. The hollow was lined with green leaves from the wild lettuce plant, which made a nice mattress for the babies. Over and around them Mother Rabbit tucked a soft grey cover. How do you suppose she made this little blanket? By pulling little bits of fur from her own warm jacket. She patted the bits together with her little paws until it was a fluffy, warm covering.

JUST TWO WEEKS OLD
The six little pharmacists at a very early and tender age

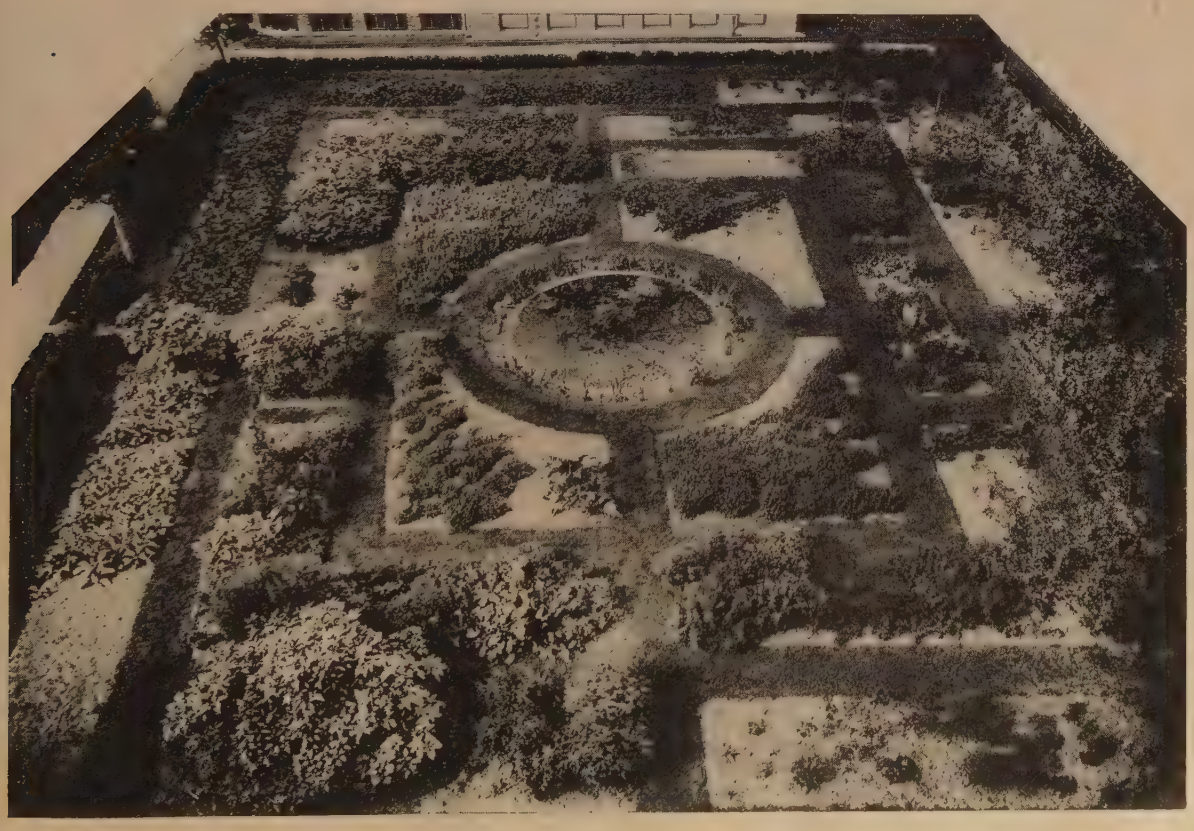
In the morning the Gardener stood and looked at the grass in the triangle. He scratched his red head. "My, but that grass does grow! Sure, I shall have to be cutting it this very morning", and he got out the lawn mower. All the shining blades went snip, snip, until the air began to smell sweet and fragrant. Suddenly the Gardener stopped his lawn mower and leaned way over, so far over that his chin was on a level with his knees. "By golly, now what do ye think that

may be?" he asked the world in general. You see he had discovered the little, grey, fuzzy blanket. Very curiously he lifted a corner and peeked under. When he saw the six babies, he laughed out loud and slapped his big knee. "Ye little skeeziks," he said and put his big red hand into the nest. The babies went bump, bump against his hand, because their eyes were all shut up tight so that they couldn't see, but could only bump into things with their snubby noses. They had tiny feet that had so little hair on them they looked almost pink. Their long ears lay down upon their silky brown heads. They had the littlest tails you ever saw. The sun was beating down upon them, but how they liked it! They kept crawling over and under each other so that they were always very much mixed up. It was really hard to tell where one baby left off and another began. They were so tiny the Gardener was afraid to pick them up so he tucked the blanket around them again.

Now here was a to do. If he cut the grass the nest would show plainly from the sidewalk and someone would surely carry the babies away. There was just one thing to do. That was to let the grass keep on growing. Then people would walk up and down the paths and never dream that the grass hid six baby cottontails. As for stray dogs and cats, the Gardener filled his pockets with stones right then and there.

Every morning the Gardener sneaked out to see them. They were always sound asleep. Their tummies were always round and full, so he knew Mother Rabbit must come at night to feed them. That was exactly what she did. She didn't want anybody to see her hopping over to the little nest. All day long the babies were sung to sleep by the catbirds and brown thrashers. All day long the butterflies flew back and forth over the nest. Who knows? Maybe they whispered the latest news from the nursery into Mother Rabbit's long ears as she hid in the nearby bushes. One night the Gardener wanted to see Mother Rabbit. He sat down under a bush and waited for her. It grew very quiet. Sleepy birds were twittering as they went to bed. A bullfrog began to sing from the little pond in the herb garden. Tiny squeaks came from the nest of the cottontails. Plainly the babies were saying, "Hurry Mother Rabbit, we are so hungry!" The Gardener began to worry. Suppose some accident had befallen Mother Rabbit. Then he saw her hopping out from under some bushes. The edges of her ears shone in the moonlight. A dozen hops and she was with the babies. Softer and softer grew their squeaking voices. When the silence of contentment brooded over the nest, the Gardener rose from his cramped position and stole away.

Late one day, great clouds rolled up from the edges of the world, and down came the rain. It seemed as though someone were emptying buckets full. The babies in their nest were in danger of being drowned. The Gardener found the grey blankets sopping wet, and cold. The babies were lying in a little pool of water. The Gardener ran to his toolshed and in a moment was back with a lot of things under his arm. First he stuck three sticks in the ground around the nest. Over these he laid a heavy canvas. Then he put rocks on the corners of the canvas for the wind was blowing hard. But before he fastened down the last corner he lifted off the wet grey blanket and tucked in a lot of white cotton-wool instead. He wondered if Mother Rabbit would object to the new blanket. It was still raining furiously



IN THE HERB GARDEN

Here was where the six little pharmacists began their studies for their profession

when the Gardener left to go home for supper so he turned back a corner of the canvas tent as a doorway for Mother Rabbit. He was much worried for fear she would be afraid of the queer roof that had sprung up, mushroomlike, over the babies, and the first thing next morning he hurried over to see if Mother Rabbit had been there. It was plain that she had, for the babies were asleep and their tummies were very round. What is more, Mother Rabbit had tucked in the new white blanket as carefully as she had ever tucked in the grey. The sun was smiling again, so the Gardener carried away the canvas tent.

Soon after that an English sparrow, who was building a nest in a near-by eave-trough, spied the white cotton-wool. He cocked his head on one side and then the other that he might see better. He flew down, hopped close, and pulled at it with his bill. It pulled easily. He jerked out quite a bit. "What fine stuff for a nest!" said he and flew away to his eave-trough nest. In a few seconds he was back and this time he brought his wife. They worked hard, pulling with all their might. They had to brace their skinny legs and use their tails for props to avoid tumbling over backward. Soon they had pulled the blanket right off the nest and were trying to carry the whole thing up to the eave-trough. The Gardener came along. He chased them off and tucked the cotton-wool back in. Before he had turned the corner of the nearest building the sparrows had it off again. Time after time the Gardener tucked the cotton-wool around the babies. "It takes a clever man to outwit them sparrows, I'm thinking", he declared, "but me wife always did say I was a clever one", and he brought out a scrap of grey cotton-wool. After he had tucked it in and pushed some green grass over it, the sparrows were unable to find it again, although they sat on the eave-trough and cocked their heads for hours.

The babies were growing more venturesome from day to day. One kept creeping out of the nest to see what lay beyond. Their eyes had been open for several days now, very big and bright they were. Their fur jackets were getting heavy and of a lighter color. Each baby had a splash of white on its forehead. "Ah", said the Gardener, shoving the venturesome one back into the nest and giving the blanket an extra-good tucking in, "ye'll be leaving us soon, ye rascals." Sure enough, it was only a few days later, two weeks after Mother Rabbit had first tucked them into the little nest, that the nest was empty, the blanket cast aside. Mother Rabbit had started the Baby Cottontails in to school, for when the Gardener went into the herb garden to hoe, he saw the Babies nibbling at the herb leaves. "An' that's what yer up to", he laughed, "a-learning to be pharmacists!"

A Nature Puzzle

By Florence H. Moore

I AM a baby amphibian, belonging to the Reptilia, just hatched out into a beautiful world of sunshine, although I frequent swamps and marshes. I am just debating whether to go with my mother for a swim, or stay where I am and let you find me. Yes, my mother is in the picture too, looking as pleasant as anyone can, who has just been called something else instead of what she is. People often make that mistake, so we hope you won't. For one thing, we have shorter and flatter heads than our cousins, whom we resemble. However, if you are in doubt, find the letters of my name, which are also in the picture. Where letters repeat, only one is given.

You might look up the meaning of the big words too, in the dictionary, then you'll know that much more about me.

Answer to August Puzzle

SWAN

Nursery Nature Tales

Being the Adventures of Toby and Beth, Two Very Little People in the Big World.

Caterpillars—UGH!

by Elizabeth K. Peeples

"Mother! Toby! Ugh- h-h! !" Beth had stopped suddenly in the middle of the garden walk. She was screaming, and tears ran down her cheeks.

Mother and Toby hurried to her.

"See the green snake," she sobbed, burying her face in Mother's skirts.

"Why that is a parsley caterpillar, dear." Mother took the velvety green worm on her hand. "See the black stripes and yellow dots on his pretty green coat!"

Beth let one eye take a peep, but at that very moment Toby poked the caterpillar with a dry grass stem, and it pushed out a pair of orange horns, which before could not be seen. With the horns came a most unpleasant odor.

Toby shouted with glee, but Beth hid her peeping eye, and sobbed afresh.

A few pats quieted her. Then Mother said, "Poor parsley worm, it has no way to defend itself, so to keep the birds from eating it, it shows its harmless horns, and throws out the odor which they dislike."

"Do the birds want to eat it?" Beth's sympathy made her forget her fears.

"Here's another one. Watch him eat that parsley leaf." Four round brown eyes stared at the caterpillar.

"Out in the lawn there are caterpillars covered with brown hair, and I saw some very fancy ones on the elm tree," said Toby.

"Would you like to make a caterpillar house, so you can keep some of them and watch them for a while?" asked Mother.

"Oh, yes," cried Toby and Beth. "You tell us how."

So Mother told them how, and this is what they did. They got an empty wooden box at the grocery store. They put fine, soft earth, six or eight inches deep, over the bottom of it, and covered the top with wire netting. A jar of water, also covered with netting to keep the caterpillars from falling in, was placed in one corner.

Then they collected caterpillars of all colors, sorts, and sizes. And every time they put a caterpillar in the box, they also put a spray of leaves into the jar of water, of the kind the caterpillar was eating when they found it. Every day Beth filled the jar with fresh water, and Toby brought fresh leaves. The old leaves were taken out, and the box kept clean. Often the children watched the caterpillars.

"Their mouths are just like scissors," said Toby. "See how they cut the leaves! They eat so much they will get fat."

Just then a strange thing happened. A spiny black caterpillar, that had been resting quietly on a leaf, split its skin all the way down the back, and out of the old skin came a green parsley worm.

"That is the way caterpillars grow," explained Mother.

"Look, Beth, here's one that is all tangled up in a thread. How did a thread get into their house? Why it's coming out of the caterpillar's mouth!" Toby cried.

As the children watched, the caterpillar spun a silk blanket round itself for its winter nap.

On another day they saw the parsley worm fasten itself to the side of the box, shed its skin for the last time, and hang there a quiet yellowish-brown object.

A tomato worm went into the earth on the floor.

At last every caterpillar had gone to sleep.

"What shall we do with them?" asked the children.

"We will keep the box on a corner of the porch until spring," said Mother, "to see what happens when they wake up."

"We must remember to watch them," said Toby.

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A Suggestion for Nature Examinations

It is not the sole purpose of examinations to determine how much the examined parties know in order that advancement may be recommended or refused. Examinations are useful in determining the level of training or experience of the members of a group so that the leader may adjust the work given to the needs of the group. For this reason, it is not inappropriate to discuss Nature examinations at this time which marks the closing of many summer camps and the beginning of winter sessions of school work. Furthermore the type of examination to be suggested lends itself well to the game spirit and may be employed with modifications by those not concerned with the more or less formal advancement of individuals in the realm of Nature lore.

The writer was once asked to examine in Nature a group of boy scouts who had come from widely separated counties. These boys had as a competitor a local boy who was well known to the examiner and who knew well the terrain over which the group would wander in the course of the examination. How to give an examination in which the visitors would not feel that the local boy had undue advantage was the problem. It might have been solved by prescribing a list of things to be known before the examination and then limit the questions asked to apply to these requirements but this smacked too much of the "cramming" which has questionable value in such cases. It might have been solved by announcing that the material upon which the boys would be examined could be found within a reasonably small and definitely defined territory and then devoting some time to allowing the individuals to go over the territory and ask questions more or less privately of the leader to help them on those points with which they were not familiar but this too gave the local boy some advantage and might cause a feeling of confusion before the examination which would be undesirable. The problem was handled as follows.

No limits were set as to fields of science on which a boy might be examined. This was an examination in nature study, not in bird study or rock study or insect study or mammal study. No one, not even the examiner, knew particularly the path that would be followed by the group during the time allowed. Ten boys were to be examined and it was agreed that there were to be fifty questions. The examiner had a card with the names of the ten boys on it. In addition, he had a paper which he himself filled out during the course of the examination. Each boy was told that he would have the privilege of selecting five things about which he could ask a question which he and all the others would attempt to answer. As a boy selected a thing about which he would ask a question, the examiner would place a check after his name on his card and would also ask the boy to name the thing to him privately or answer the question if it did not call for the giving of a name. In this way, the instructor made certain that the boy asked about something on which he, the boy, had accurate information and in case of error the correction could be made or the boy could be asked to prove that he was right. As soon as a boy had five checks after his name he could of course ask no more questions but when the ten boys had asked their questions the fifty questions agreed upon had been asked and each had contributed exactly the same number of questions. There was no dissention whatever and everyone agreed that the examination was wholly fair. It is believed that the questions asked represented a fair cross section of the Nature knowledge and experience of the group and that it was accordingly just to assume that the boy answering the highest percent of the questions correctly was probably the best all around naturalist of the group.

The questions asked by the boys did not confine themselves to the naming of things but included as well questions on the habits of certain insects and birds. The greatest difficulty that had to be overcome lay in the tendency of the boys to wish to delay making a choice until they found something that they thought the others would not know. This required that the leader give the boys who had asked the fewest questions a reasonably short time limit in which they still had the privilege of asking a question. If this time limit was passed the leader asked a question and checked it against the allotment of the slowest boy. Inability of the examiner to be able to answer correctly himself all the questions asked might put the burden of proof on the boy asking the question. Such problems as dealt with plant study and rock study could be checked by bringing in sufficient material to check up on details. This was done in a subsequent examination, specimens being placed in envelopes numbered according to the questions.

This method could, of course, be easily adapted to apply to any limited group. On one trip, one might confine the questions to rocks; on another, to insects; another, to birds and so on. It should be a useful method

in opening up a new subject to a group since it would give the teacher or leader a cross section of the experience of the group. On this the teacher could build the desired program of activity. A method such as this should be useful to teachers of general science who desire to first know something of the experience and interests of the pupils with whom they are to work. It need not confine itself to unmodified nature but might include highly artificial materials and phenomena. The writer has used the method—he believes with success—with laymen, children and college students. It has also been used successfully by Dr. W. G. Vinal with boy scouts.

ANOTHER KIND of GARDEN

by Eunice E. Myers

WHILE on a solitary ramble across country I came upon a bank covered with fresh moss with here and there a patch of lichens and a number of small ferns breaking through the soft green mat. In the Fall, when the frost had killed all the hardiest late-comers in the flower world, the memory of the bank with its bright spots of color returned so vividly I decided to try once more to find this winter garden. With my friend of the out-of-doors I set out early one afternoon on the quest.

A GARDEN IN A FOUR-INCH BOWL
Tiny ferns and scarlet-tipped lichens against a glossy green carpet of two kinds of moss

A keen wind was blowing, but by the time we had walked half a mile both of us were ready to agree that the day was quite warm. We finally reached the log where the year before I had seen the lichens and, sure enough, we found them waiting for us. The modest little plants scarce half an inch high combined in their tiny selves all the virtues, save that of odor, of a real flower garden. There they nestled in the moss, hardly large enough to notice yet once known, not easily overlooked. I dug some out of the moss after an appreciative survey of them in their natural setting, and turned them carefully over in my hands, marveling again at the delicate and arresting color combinations they displayed. The soft gray-green of the foliage was dotted with tiny crowning clusters of bright vermilion, soft geranium pink frosted with white, or brown just as soft, not petals as in an ordinary garden, but little cushion-like pads evidently the fruiting part of the plant. Here were some, cone-shaped, dark brown and fuzzy with several tiny spheres looking for all the world like birds' eggs nestled together inside the nest. Near by grew a clump of reindeer moss which, in its delicate tracery of gray-green stems, rivaled Jack Frost's winter pictures in intricacy and beauty of design.

A FASCINATING PIECE OF TURF
It contains many fragile and lovely lichens, as does the piece of bark at the right

We gathered as much of each kind of plant as we could carry without crushing and turned homeward, elated at our success and happy in spite of numb fingers and muddy feet. We spent the evening sorting and planting the fruit of our labors in a glass fish-bowl, moss and lichens and a tiny fern making the little garden a pleasure to look upon. With a glass cover to keep in the moisture the lichens thrived and grew to be an inch tall while one of the ferns grew too large for the dish. We enjoyed this experiment so much we decided to repeat it just as often as the season brought us a new wealth of material.

Singing Rivers of Mud

by Lawrence W. Pedrose

ONE of the most interesting features of the Andes, the great backbone of cordilleras covering the northern part of South America, is its "singing" rivers of mud. During certain seasons of the year rain falls in torrents, converting the foothills of the mountains into actual streams of flowing gumbo, and so rapidly is this erosion occurring the whole outline of a chain of mountains may become unrecognizable in the course of a year. The higher cordilleras, with altitudes of 10,000 to 12,000 feet, are being washed down at the rate of five feet or more a year, and it is believed that in a few centuries the Andes will be leveled and formed into vast plateaus like the hinterland of Patagonia. The mountains are composed, for the most part, of glacial moraine, a mixture of powdered rock and clay. The winter rains carry this alluvial material down the valleys in a semi-liquid state and form vast plains. It gurgles with a musical sound like poured molasses.

(Left) THE EFFFCT OF EROSION
(Below) One of the singing rivers of mud which sweeps vegetation before it

Questions and Answers

The American Nature Association will be glad to answer each month such questions as its members ask about Nature.

QUESTION: *Is there any way in which owers, such as sweet peas and petunias can e preserved so the parts of the flower can e studied later?—J. R. M.*

ANSWER: Flowers may be preserved in lcohol or formalin or a mixture of both.

QUESTION: *Is formaldehyde the best solu-ion for preserving insects? How should e commercial solution be diluted?—J.R.M.*

ANSWER: Commercial formalin may be sed as a preserving solution. About 18 or 9 parts of water should be added to the ommercial product. This mixture may be iluted with alcohol, if desired.

QUESTION: *Why are planets seen in the outh and not in the north?—J. R. M.*

ANSWER: Planets are visible to the south rom the Northern Hemisphere because their aths follow in a general way the plane of ie ecliptic, which is near that of the quator. From the Southern Hemisphere ney appear to the north.

QUESTION: *Is the digestive tract of a fish lled with water? If not, what arrangement eeps the fish from swallowing water?—J. R. M.*

ANSWER: Fishes can close the throat as e can and can thus avoid swallowing water t will.

QUESTION: *Insects lack red blood. What ien carries the oxygen to the tissues?—J. R. M.*

ANSWER: The blood in insects passes from ie heart directly into the body cavity, and ience into the cavities of the appendages.

QUESTION: *Please tell me how to raise and are for angleworms. I want to have them n hand in the dry season to feed the birds nd use for fish-bait—W. J. V. O.*

ANSWER: Angleworms do not require any articular care. Their requirements are rich irth and moisture, and if such a location provided for them in a general area of ss favorable conditions, they should repro-uce abundantly and stay where planted. In ie days when the kitchen sink was allowed empty back of the house, worms were lways plentiful there. This will afford hint as to favorable conditions.

QUESTION: *Can alligators be forcefully d. If so, on what?—E. G.*

ANSWER: The main difficulty in feeding lligators arises from the fact that they can ot swallow their food except when sub-nerged. They are also sometimes averse to ating during the winter, but if it is thought iat they need food, we believe no harm will ome from persuading them a little, under ater. Small strips of fish form a favorite ood.

QUESTION: *What can snakes be fed on?*

ANSWER: Ordinarily small snakes feed rgely on insects.

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A Peony Advertisement—Plus

MONS. JULES ELIE

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A new customer recently told me that one of my contemporaries had "admitted" to him that this business is looked upon from Maine to California as the most reliable and dependable one in existence—Thank you.

As a result of years of unceasing vigilance and care, my peonies are now in the condition where, for two successive years, not one "rogue" or mixture could be found in our entire fields, and during the past 15 years at least we have not received on the average one complaint a year as to any peony we sold coming untrue to name.

My 1927 peony catalog, the only one that has been published annually on this flower alone for 22 years, is yours for the asking, and it's a catalog—also plus.

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NATURE NEWS AND Views

Essay Contest

Announcement of an essay contest under the auspices of the Horticultural Society of New York was received just in time to be included in this issue. The contest is in two classes, these subdivided into two others so far as subject matter goes. For Juniors,—boys and girls 10 to 13 years,—an essay of 300 to 400 words on Trees may be submitted in Class A, or an essay of similar length on Wild Flowers in Class B. For Seniors,—boys and girls 13 to 17,—an essay of 500 to 600 words on Trees may be entered in Class C, and an article of similar length on Wild Flowers in Class D. One essay to a competitor, submitted without name of author otherwise attached except in a plain, sealed envelope and before noon of September 15, 1927, is provided for in the rules. Essays should be sent to, and information obtained from The Horticultural Society of New York, 598 Madison Avenue, New York City. There is no indication that there is any geographical limitation on the contestants.

Italian Birds (?)

A mockingbird family was reared in the yard of Mrs. W. A. Showalter in Houston, Texas, and was accustomed to the gift of an apple every day. One day there was no apple but a dish of spaghetti, salted and peppered, was left on the porch. The whole mockingbird family pitched in and was none the worse for the seasoned dish, although their hostess feared for them. Mrs. Showalter writes that she can call, "petite, petite", and the male bird will fly from the cypress tree, calling "petite, petite" in reply.

New Nature Club

There is ample testimony to the widespread interest in Nature in the rapid growth of the Watchung Nature Club of Plainfield, New Jersey, which had passed the hundred member point after a few weeks' organization. The Club is a part of the city's progressive recreation activities and is under the direction of R. O. Schlenter.

Judge C. W. Lusk

It is so unusual that it is worthy of note, for a judge to digress in his speech-making long enough to devote a portion of his remarks to the necessity of protecting wild flowers. Yet, Charles Wesley Lusk, Judge of the criminal court at Chattanooga, Tennessee, is such a great Nature lover that he does this very thing when he is making a speech before large audiences by which he is in great demand.

In incorporating in his addresses the necessity of wild flower protection his plea has a wonderful effect, and his example is worthy of copying by others serving in similar capacities. Judge Lusk was brought up in one of the most picturesque Nature spots in southeastern Tennessee which may partly account for his inherent appreciation of Nature.

ROBERT SPARKS WALKER.

West Coast Branch

A Pacific branch of the American Nature Study Society was recently organized in Seattle, Washington, with Floyd Schmoe, Park Naturalist of Mount Rainier National Park, as president. F. P. Sipe of Corvallis, Oregon, was chosen as vice-president, and Mrs. Helen T. Bush, 133 Dorffel Drive, Seattle, is secretary. The members are drawn from California, Oregon, Washington, Alaska and Hawaii. Any of our Pacific Coast members interested in the work of this branch can learn of its plans from Mrs. Bush at the address given.

Home and Arboretum

Set within the confines of an arboretum boasting all trees and shrubs that will grow in the locality, a new home that is to be at once a memorial and an office, is to be constructed by the Davey Tree Expert Company of Kent, Ohio. Congressman Martin L. Davey, president of the company, announces that the new office-home will be erected as a memorial to his father, John Davey, who was, also, the father of tree surgery. The building will not be pretentious but fit into the setting of trees and gardens that are to surround it. The thought is to make it all an epitome of the out-of-doors.

New Butterfly

Professor Andrey Avinoff of Carnegie Museum, Pittsburgh, has found in Cook Forest what he believes to be a new species of butterfly thought to be of the genus *Melitaea* and related to *harrisii* of that genus. The butterfly is an unusual brown, about an inch and one-half in diameter and with a yellowish band across the underside of the wings. This underside is yellow and black mottled with reddish brown spots. The specimens found were females and Dr. Avinoff is spending his vacation in Cook Forest in search of the male. Such an instance serves well to emphasize the need of preserving such areas as Cook Forest for the protection and propagation of wild life.

Y. M. C. A. Reforesters

A remarkably fine work is being carried on by the State Committee of the Y. M. C. A. of Michigan at its camp for boys on the shores of Torch Lake, Antrim County, Michigan. Camp Hayo-Went-Ha was established there 24 years ago amid a heavy beech and maple growth, but four years later this was cut over and fire followed. Second growth hardwoods are doing well, but in 1923 a program of reforestation was inaugurated. About 170,000 trees were set out and the next four years will bring the plantings to 300,000. The value of such projects in developing an appreciation of the importance of reforestation is incalculable.

A Valiant Mother

Across the clover field the mowing machine was cutting its way, writes Marcel Theriault of Riverside Farm, Nashua, New Hampshire. Suddenly a female pheasant flew from under the cutter bar, uncovering a nest of fifteen eggs. Sadly enough, the mother lost about a quarter of an inch of one leg to the cutter. The mowing went on and the mower did not look again at the nest until one o'clock, having watched it from his work until noon, during which time the mother had not returned to the nest. At one the eggs were gone, but a few weeks later this mother pheasant had a flock of twelve youngsters about her. During the winter, Mr. Theriault adds, this bird was among those fed at the farm, doing quite well despite her limp. She is called Sarah Bernhardt for obvious reasons. Mr. Theriault's last paragraph is particularly interesting when he states that they have a game and bird sanctuary of one thousand acres established five years ago. Then it boasted one hen pheasant and two cocks and two or three partridges. Now there are some forty partridges, rabbits, many squirrels of various kinds, and a wide variety of birds who visit the winter feeding station.

Experiment Stations

Columbus, Ohio, has been selected as the headquarters of the new Ohio-Mississippi Valley Forest Experiment Station of the U. S. Forest Service. The station will work in cooperation with the Ohio State University and the Ohio Agricultural Experiment Station. E. F. McCarthy has been appointed director.

Announcement is also made of the establishment of the Allegheny Forest Experiment Station to serve Pennsylvania, Delaware, Maryland and New Jersey. R. D. Forbes has been named as director.

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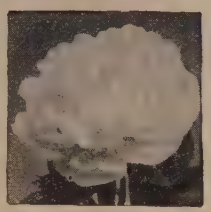

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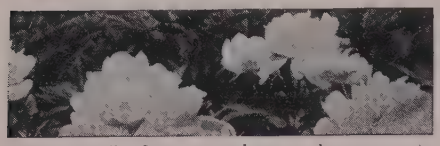

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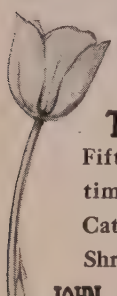

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Fooling Sparrows

"I must tell you an amusing story of our birds which happened two days ago," writes Margaret Adam, Mountain Sanitarium, Hamilton, Ontario. "We had bluebirds at the first and one pair tried twice to build in our box but sparrows plagued them so they finally left much to our sorrow for they are so dainty and pretty to watch. So we have only robins and sparrows. One pair of robins worked strenuously all one morning building a nest in a tree just outside our window in plain view. Suddenly one of our girls called 'Oh look, that sparrow is stealing the robins' nest'. So all that day we watched the robins rebuild only to leave a moment and come back to find the sparrow who also had appropriated the bluebirds' box had been again in their nest tearing great pieces out. We noticed Mr. Robin seemed quite lazy and indifferent about it and that they seemed to fly to a certain fir tree to discuss matters frequently. Finally in the late afternoon the sparrow had wrecked the nest so that the wind finished it. We were so annoyed we scolded the sparrow roundly but Mr. Robin just seemed to look at it, run at the sparrow, say 'Cheep', pull up a worm to eat calmly, then looked at his wrecked home again. We were so disappointed but today one of our girls happened to investigate the fir tree and found a splendid snug nest carefully hidden away in and Mrs. Robin quite contented in it. So now we've decided they were merely building the wrecked home to keep the sparrow from finding their real home but it really was cleverly done."

The Canny Raven

Ravens frequently adorn the totem poles of the Indians of the northwest coast of North America, for they are sacred birds to these peoples. They are canny birds, also, and Joseph Mailliard of the California Academy of Sciences contributes an interesting note about one raven to *The Gull*, monthly bulletin of the Audubon Association of the Pacific. He writes:

"In the coast settlements it is somewhat of a nuisance, as it has a great liking for prancing around on the roofs of the houses, where it can make noise enough to awaken Rip Van

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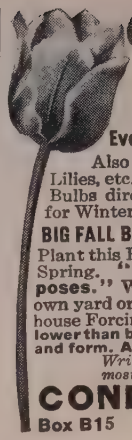

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Winkle himself. However, if the suffering inhabitants draw a few pieces of white string across the roof and fasten them to low uprights, the Ravens will become suspicious of some sort of a trap and they will not alight upon a house so protected.

"The writer happened to be in Sitka, Alaska, when the following incident occurred—an incident of so strategic a nature as to seem worth relating. One of the night guards at the Federal prison came into the hotel for breakfast one morning evidently bubbling over with a tale to tell. While on watch he was accustomed to partake of a cold lunch about 2 o'clock in the morning and on this particular occasion he had tossed a very succulent bone to a small dog that was tied in the prison yard. A Raven caught sight of the bone and a great craving arose in the bird's breast, or mind, or whatever a bird craves with. The Raven flew down to the ground in front of the dog and cocked its head to one side in deep thought. Then it began to walk around and around the dog, cawing at him and striving to draw his attention away from the bone. But doggie was a watchdog—he watched out for his own interests—and was too foxy to be caught napping, having probably been caught that way when he was young and accumulated wisdom since. After encircling the dog several times with no result, and meanwhile exhausted its vocabulary, the Raven flew away, but, much to the surprise of the observer, it shortly returned with a companion. One of the two birds immediately planted itself in front and just out of reach of the dog, while the other deliberately flanked the enemy and attacked him in the rear by giving doggie's tail a most vicious peck! This was too much of an affront to be put up with and the dog jumped around to defend himself. Needless to say, the other bird grabbed the bone and made off with it. The one bird had the bone and the other had the fun."

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School Sanctuary

Bird study resulted in nineteen Audubon Clubs in the establishment of the "Marr School Bird Sanctuary" in one of the city parks. Saturday, May 7, 1927 in the presence of five hundred people and many of the city officials, the children placed forty-five bird houses and a feeding station in the trees of the park, and presented a pageant which depicted the coming of spring.

Fire Aids Insects

Fire and insects are often close allies in the work of destroying trees in the forests, says the Forest Service of the United States Department of Agriculture. A recent study of an area badly infested with the western pine beetle, according to forest officers, revealed that nearly four times as many trees were killed by the depredations of the insect in a burned-over tract as were killed in the adjacent unburned forest in the last two years.

In Central Park

That New York values Central Park is testified to by the appropriation of one million dollars for the restoring and reinvigorating of its trees. Walter R. Herrick, Park Commissioner, has wisely decided to depend upon the advice of experts in performing this task. James A. G. Davey, the noted tree "doctor" has volunteered his services for the work and will serve without compensation. Mr. Davey has already conducted research in the Park and saved ninety out of one hundred "sick" trees. Through his experiments he discovered that the difficulties surrounding the trees was more dietary than anything else. That, together with the red spider, he has concluded, constitute the greatest problem rather than gases from automobiles and chimney smoke.

A Squab Pet

Mrs. Lucy O. Gullett of the Lincoln, Illinois, school department writes an interesting account of a pet squab. It was one of two originally destined to make a toothsome meal. One member of the family, however, refused to permit the sacrifice and although one squab died, the other grew and prospered after a bit of forced feeding. It became known as "Squeek" and soon was following the writer's mother about the house, perching on the dog's back, pecking at the door when desiring to come in and refusing to fly away when taken out of doors. Frightened by a dog, one day, the pigeon sought refuge on a neighboring roof and refused to come down until it heard the writer's mother's voice. Thus can the friendship and confidence of birds be won.

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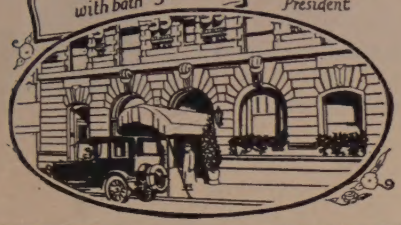

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A Wise Blackbird

Miss Ada Miller of New Carlisle, Indiana, suggests that the blackbird she saw in her yard dipping a leaf in the dewy grass and wiping under each wing was a very wise blackbird to devise such a way of bathing. We quite agree.

Birds Pay Rent

Melvin and Jerome Vollbrecht of Sheboygan, Wisconsin, were cleaning out the marten house in their yard and what should they find in it but a dollar bill, according to the Sheboygan *Press*. The instance of these rent-paying birds was called to our attention by J. V. R. Evans of that city.

Odd Home Site

There is an old railway coach that jolts between Yreka and Montague, California, and it has been carrying a passenger that pays no fare, writes U. F. Brown of Yreka. The passenger is a wren who built her home in an opening in the coach, travelled while sitting on her eggs and made the train every day to take the trip with her babies when they hatched. Feeding time was between trains.

New Oregon Law

In the state of Oregon a new law has recently been enacted which prohibits the exportation from the state of certain bulbs and plants of native wild flowers. The list enumerated for protection by this law at the present time comprises a comparatively small number of genera, including only those which have been particularly in demand by collectors for commercial purposes. They are Lilium (including all the wild lilies), Calochortus, Fritillaria, Erythronium, Cypripedium, Calypso, Lewisia and Douglasia. Others will no doubt be included as the necessity arises.

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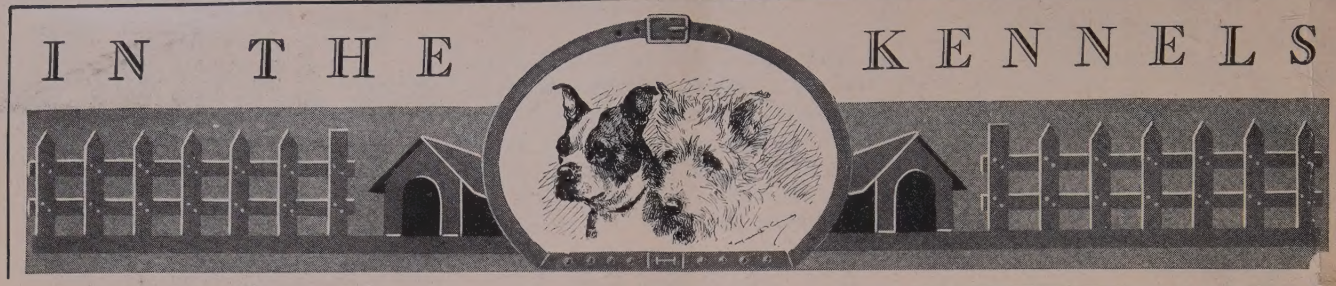

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TREE PLANTING ARMY IN GREECE PLACES 60,000 TREES

AT the direction of C. C. Thurber of the American Near East Relief at Athens, Greece, who reports to the American Tree Association, 60,000 trees were planted in one day on the slopes of Hymettus. School children and orphans made the pilgrimage following the preparations a week in advance by the army. There were several bands in the parade. In his work Director Thurber is using the Forestry Primer published by the American Tree Association. The need of reforestation in Greece, he says, is acute. Now that tree planting time nears here is a lesson for Americans. The Association has tree planting instruction ready and it welcomes all tree planters to membership in the tree planting army.

A memorial grove of famous trees has been inaugurated at Mt. Vernon, Wisc. In the list are trees for George Washington from Mt. Vernon; Abraham Lincoln from Hodginsville; U. S. Grant from Galena; Rutherford B. Hayes from Fremont; Wm. McKinley from Canton; Gov. Lucius Fairchilds from Madison; Gov. Jeremiah M. Rusk from Viroqua; William D. Hoard from Ft. Atkinson; Gen. John J. Pershing from A. E. F. Headquarters, Chaumont; Joan of Arc from Domremy, France; Robin Hood Oaks from Sherwood Forest, England; Napoleon Willow from France. The most recent dedications are of trees from Gov. Farwell, Elm, from the Farwell Home; Gov. Washburn, Elm, from the Washburn Home; Gov. Taylor, Maple, from the Taylor Farm; Theo. Roosevelt, Dogwoods, from Sagamore Hill; La Follette, Elm, from the LaFollette Farm. J. S. Donald arranged the program.

The National 4 H Clubs, when encamped in Washington, planted a hemlock tree presented by F. W. Besley, State Forester of Maryland. The ceremony took place on one of the knolls of the Department of Agriculture Grounds. Col. W. B. Greeley, Chief Forester, spoke.

Following a gift of young forest trees by John D. Clarke, co-author of the Clarke-McNary Forestry Act, to the boys of the Walton, N. Y. public schools Prof. Sheldon E. Brink is organizing a forestry club. Boys who planted the trees are: Leigh H. Seely; Leroy Robinson; Harland Francisco; Wilford J. Doice; Winfield R. Baster; Sturgis B. Goodrich; Raymond Benedict; Robert H. Loher and Glenn C. Miller.

Three trees were planted in Memorial Park, Reading, Pa., in memory of Joseph S. Temple, Samuel Pierce and Alden Batchelder, whose families made possible the creation of the park. The trees were raised from nuts of black walnut trees.

Green Woods chapter, Daughters of the American Revolution, have had 12 new pin oaks set out in memory of the World War veterans of Winsted, Conn., who lost their lives.

In commemoration of bishops and governors of Maryland, World War heroes and various patriotic organizations, trees, shrubs and bushes were planted in the churchyard of Christ Protestant Episcopal Church, Queen Caroline parish, Howard county, Maryland. The ceremony was part of the celebration of the two hundredth anniversary of the parish.

Tree planting reports to the American Tree Association by Mrs. H. G. Eakins of Pittsburgh include that by the Congress of Clubs with Mrs. Nina Hood McCullough as chairman which placed 10 trees in the grounds of the Children's New Hospital, in honor of Mrs. John S. Sloan, retiring President, and The New Era Club with Mrs. Nina Hood McCullough as chairman, one spruce tree; Pittsburgh Chapter American War Mothers, 18 trees in a Memory Lane on the grounds of the Aspinwall Hospital for Marines; Woman's Club of Ingram, three trees; The Butler Woman's Club, 24 trees on grounds of the New Hospital.

Mrs. Arthur Adams of Hartford, Conn., reports the planting of a spruce to mark the 70th birthday of Charles Lathrop Pack, also a Christmas tree and other memorial trees.

The Forestry Club of Mt. Clemens, Mich., is joining the American Tree Association. New members announced by W. O. Pryce are: Mr. and Mrs. Allan G. Straight, Omar P. Stelle, John Bannow, Mrs. N. F. Price, Jacob Hoffman, Walter E. Fenton.

Six American poets were honored when trees were planted on Riverside Drive, New York City. The poets are Whitman, Bryant, Whittier, Longfellow, Emerson and Joyce Kilmer, author of the famous poem on trees. The trees were planted by the Women's League for the Protection of Riverside Park, of which Mrs. John Clapperton Kerr is President. The National Society of Patriotic Women of America planted a seventh tree in memory of Mrs. Ellen Hall Crosman, founder of the society. The Camp Fire Girls of Manhattan and the Bronx dedicated a Camp Fire tree at the Soldiers' and Sailors' Monument. City Forester Wesley B. Leach accepted the trees for the city.

The Garden Club of Bala-Cynwyd, Pa., is planting trees according to the report of Mrs. W. G. Littleton. The campaign is being renewed this Fall.

Seven airplanes circled above the Fort Snelling parade grounds while the Charles Lindbergh memorial of 25 evergreens was planted by the Woman's Civic league of St. Paul. Col. John T. Axton, chaplain-in-chief of the Army opened the services. Mrs. Marguerite Craighead was chairman of the committee.

When six hundred Boy Scouts visited Camp Roosevelt, Washington, D. C. for the first time a Norway Maple was planted. Commissioner Barry Mohun officiated.

Reproduction from a painting made on the Piping Rock Club, Locust Valley, Long Island, New York, by Frank Swift Chase

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